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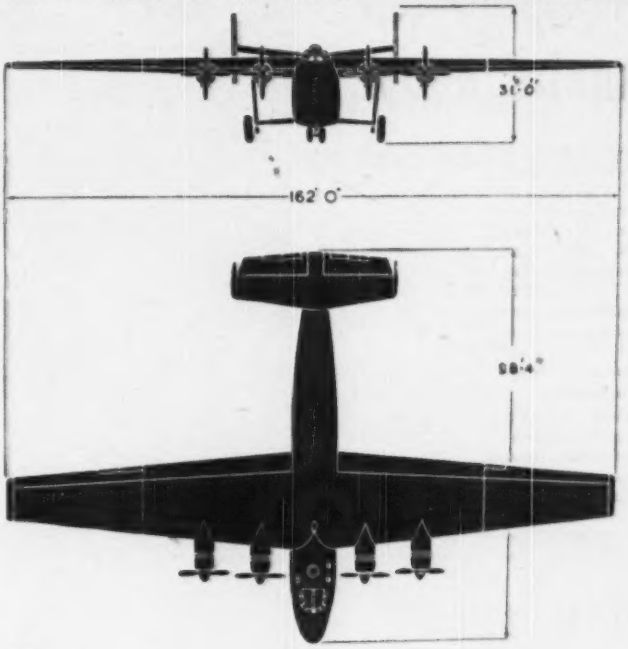

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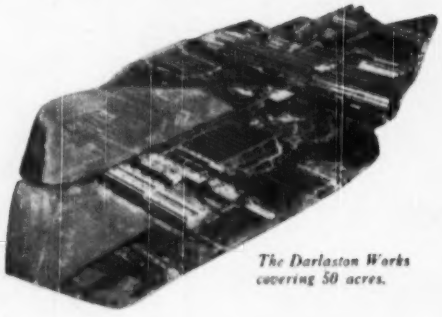

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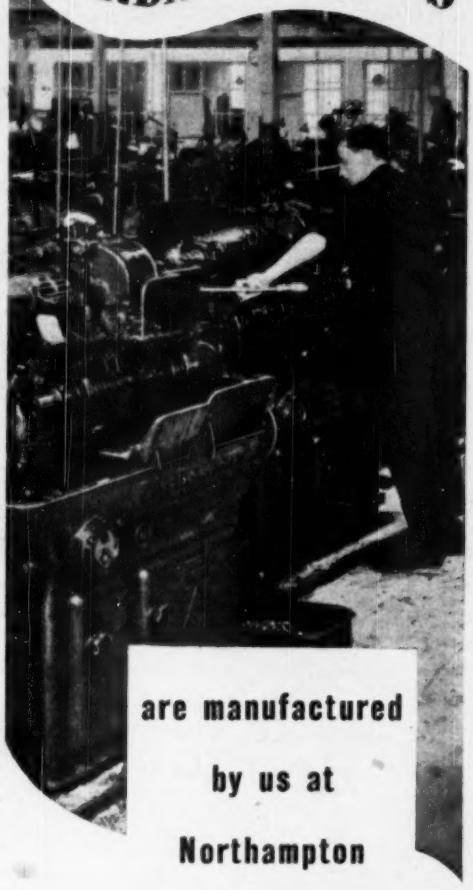

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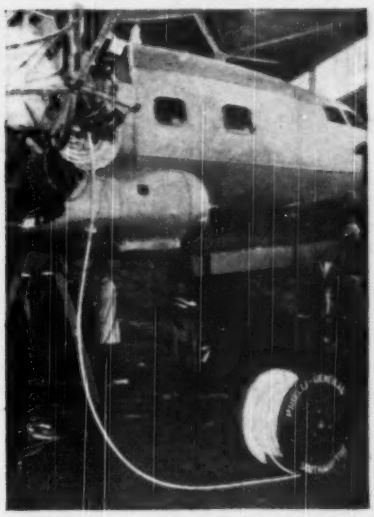

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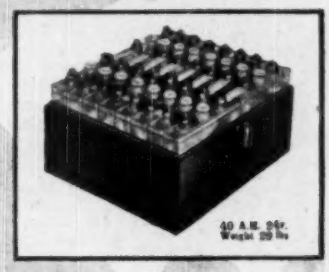

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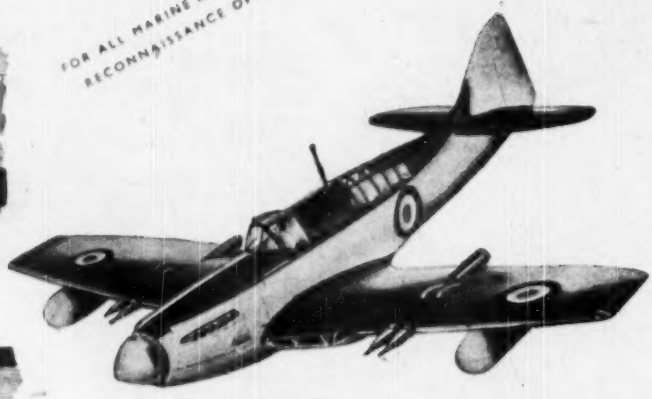

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The Gas-turbine Goal

TO the remarkable achievements of the first de Havilland Comet, now joined on its home tarmac by a second machine, and to the performance of the Canadian Jetliner, can be attributed the greatly increased interest, all over the world, in pure-jet transports. This became particularly evident after the S.B.A.C. Display at Farnborough last year and again after several extraordinarily rapid flights by the Comet to foreign capitals and airfields.

While the principal British advocates of the turboprop and turbojet airliner seem to maintain their enthusiasm at a more or less steady pitch, this is by no means the case in other countries. In America, almost every well-known aircraft constructor and airline executive, the majority of designers, and many others, have felt impelled to voice their opinions on the subject of pure-jet airliners. Some say the United States has missed the boat, others that American jet transports will be available by the time the operators are ready to use them. There are those who believe that U.S. airlines may have to buy Comets in order to compete; others who say "Never—at any cost!" All, however, are unanimous that someone else ought to pay for the design and development of civil jets in America.

In this country, also, costs—development, production and operating—are still worrying all concerned with gas turbines; for expense is at present a problem common to all such units, whether shaft-power or thrust-producing. Fortunately a great deal of the work of designing, building and developing power units for such aircraft as the Viscount, Comet and Apollo has already been accomplished, and overhaul life and fuel consumption are being improved steadily. Much still remains to be done, however, and there is little likelihood of any turbine-powered airliner seeing regular service before 1952. The simpler, more rugged, centrifugal-compressor units in use today will, it seems, have to be replaced during the next few years by more delicate high-compression axial designs if fuel consumption is to be brought down to a figure approaching that of the large piston-engine.

Recently there has been a slight swing-back in favour of the turboprop airliner, and, as a result, the possibilities of this type of aircraft have excited lively interest and considerable activity in America—this in spite of frequent suggestions that, because of the complication and weight of the reduction gearing and airscrews and so on, turboprops might profitably be by-passed by the simpler, though less economical, pure jet.

No turboprop (or turbojet) airliner specifically designed as such has yet been announced in the United States, but several proposals to re-engine successful existing piston-engined types, among them the Convairliner, Martin 4-0-4, and DC-6, are under discussion or actually in hand. These offer attractive possibilities, but none of the airscrew-driving turbine power units which might be used have anything like the running experience required of a commercial power unit.

In Britain, on the other hand, the Viscount, designed from the start as a turboprop airliner, has already amassed some 580 hours of air experience in tests at home and abroad during the last two years; and by the autumn of last year, in addition to the two turboprop airliners already mentioned, the Theseus-powered Hermes V and Mamba Marathon had already appeared. There seems little doubt that most airlines would be glad to operate advanced aircraft like the Viscount by the time they are coming off the production line, and that on suitable routes the faster, though thirstier, pure-jet airliners will also start to be welcome in regular service in two or three years time. This does not give other countries much time to catch up with, or compete with, British manufacturers.

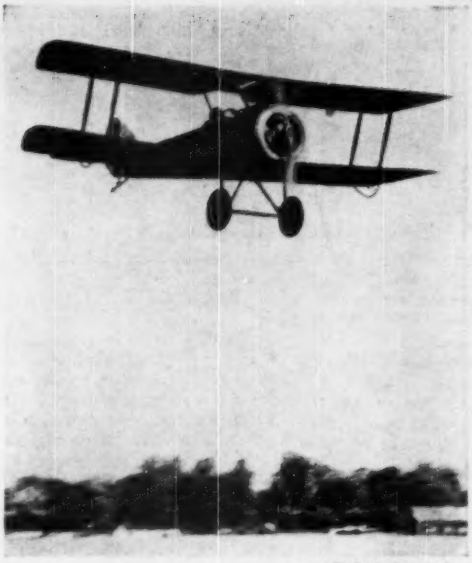
It is interesting to note that many of the views expressed in a paper prepared by Dr. Hooker, in conjunction with Mr. F. M. Owner, for the Fourth World Power Conference and concerned with the operation of turbojet, turboprop, ramjet and rocket-powered aircraft (see pages 104-106 of this issue) are a confirmation—now backed by much fact and operational experience—of views which Dr. Hooker put forward in papers read shortly after the war.

IMMORTAL THOROUGHBRED

Flying a Sopwith Pup Today : Mysteries of the Rotary Engine : An 18-yard Landing

By G/C A. H. WHEELER, O.B.E. *

IN the review of past and present Service aircraft which was included in the recent Royal Air Force Number of "Flight" the Sopwith Pup of 1916 was accorded special praise by virtue of its handling qualities. We have no doubt that there are many World War I pilots who would cheerfully forfeit a week's pay (or pension, perhaps) to recapture the delights of Pup-flying; but with only a single specimen in flying trim to-day—and that the property of a serving officer who appreciates its value and cherishes it accordingly—their dreams are never likely to be realized. Equally with the younger generation, however, they will derive pleasure from this account, written by the much-envied owner, of the charms and whims of this dainty little biplane. From this machine, they should bear in mind, the Hawker jet fighters of to-day are directly descended.



"Flight" photograph.

The author demonstrating the Pup's capabilities at the R.Ae.S. garden party. He also flew the machine at the Royal Air Force Display, as illustrated on pages 102-3 of this issue.

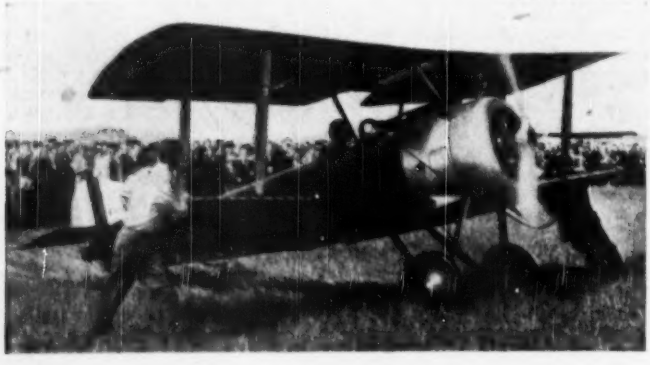
THE Sopwith Pup was a well-known single-seater fighter which was brought into war service in 1916; it achieved considerable fame and won many friends during its period of service, which lasted right up to the end of the 1914-18 war. It was also the first single-seater fighter to be flown off and landed on an aircraft carrier, being particularly suitable for this because of its slow landing speed—approximately 35 m.p.h.

The Pup is powered with an 80 h.p. Le Rhone rotary engine and before anyone tries to fly the aircraft he must learn to handle the engine. There are two engine controls: a throttle lever which operates a combined needle valve and air slide on the end of the hollow crankshaft, and a fine-adjustment lever, which operates a tapered and fluted needle in a combined petrol cock and filter. The petrol flows under light pressure from the tank to the fine adjustment, from which it is metered to the "carburetter" on the end of the crankshaft. Here the throttle lever admits air and petrol to the engine in the correct proportions. To obtain the best running it is necessary to work both throttle and fine-adjustment levers together. With this arrangement an altitude control, operated manually, is available for high flying by pulling back the fine-adjustment lever.

The normal method of starting-up is to pump up approximately 2lb pressure in the tank and open the throttle and fine adjustment for a few seconds to allow the petrol to run through. The engine is then primed in each cylinder through the exhaust ports with a small quantity of petrol (a small syringe is required for this); then it is turned through two or three revolutions, the switch is put "on," and the airscrew is swung. When the engine starts, the fine-adjustment and the throttle levers are opened to about one third of their travel, and their relative positions adjusted to get even running. When this setting is found both levers are opened together to obtain full speed—usually 1,150 to 1,200 r.p.m. By pulling back the fine-adjustment and starving the engine, and by slightly closing the throttle, it is possible to get a rather "dot and carry one" idling speed. The engine will recover immediately from being run too weak but may take several seconds to pick up if it is run too rich.

Taxying is comparatively straightforward, but there are, of course, no brakes. There is, however, the tail-skid, which acts as a brake and necessitates using quite a lot of engine power to get the Pup moving and thus gives some control on the rudder. The rudder bar is also connected with the steerable tail-skid, as on many other aircraft. This gives one fairly effective control while taxying and keeps the aircraft straight after landing.

The take-off is quite straightforward, there being practically no swing. Such as there is, is easily and almost unconsciously corrected by rudder. The only surprise at take-off is to find one's self in the air so soon. The next impression, on getting into the air, is that the aircraft is very unstable fore and aft and that somebody has forgotten to connect up the elevators—until one finds that the elevators are, in fact, so light at slow speeds that one has some difficulty in feeling them at all. The ailerons, on the contrary, are very nice indeed at low speeds,



"Flight" photograph.

With no wheel brakes to aid steering, a man at each wing-tip is useful.

* O.C., Experimental Flying, R.A.E., South Farnborough.

but tend to become spongy at normal operating speeds of between 100 m.p.h. and 140 m.p.h. The rudder is effective and pleasantly light.

So far as manœuvrability goes the Pup is a joy to fly, but the ailerons are definitely spongy at high speed and give the impression that it would not be easy to do a slow roll; in fact I believe the few people who were able to achieve good slow rolls on the Pup managed it by pushing the stick hard over until it touched their knees (which it does all too soon), and then tucking it under the knee and pushing it the rest of the way across the cockpit.

The aircraft is, as one would expect of a 1914-18 fighter, fully aerobatic. The gyroscopic action one experiences with other heavy rotaries is almost entirely absent with the 80 h.p. Le Rhone, presumably because the engine is very light and the Pup's rudder and elevators are particularly effective. The best climbing speed is between 65 and 70 m.p.h., with the engine doing about 1,140 r.p.m., i.e., full engine speed on the climb.

Looping is a very straightforward manœuvre indeed. One dives to about 115 m.p.h., then pulls the stick gently back; the force necessary to do so can easily be applied with the little finger. There is a very slight tendency to swing as one passes over the top of the loop, but it is corrected almost unconsciously with the rudder. The amazing thing about the loop, both from the pilot's point of view and from that of anyone who watches it nowadays, is that the loop itself is of such small dimensions that one hardly realizes what has happened. This is very different from the loop performed by modern fighters, which usually includes some 5,000ft of altitude and may be a mile-and-a-half or two miles in diameter.

The Pup stalls in very much the same way as all the more aged biplanes, that is to say, much more suddenly than a modern aircraft, but perfectly controllably, and with little loss of height. Recovery from an ordinary stall is immediate.

Landing Technique

Coming in to land, one closes the throttle until one gets what has been referred to above as the "dot and carry one" tick-over, i.e., throttle quarter open and fine-adjustment set to starve the engine slightly. When this setting is satisfactorily achieved the engine is switched off by the main switch (it is rather tiring to hold the blip switch down with one's thumb) and the Pup glides in comfortably at 55 m.p.h. Checking the glide at about 20ft is normal and, from 55 m.p.h., there is no appreciable float as we understand it to-day. One could undoubtedly glide in between 45 and 50 m.p.h. but the flattening-out and landing would have to be done somewhat abruptly.

The landing is perfectly straightforward and, with the rudder bar connected to the tail-skid, as described, there is no inclination to swing; without it there is quite a considerable tendency to do so, particularly when one "catches" the engine, since it is apt to come on with something of a roar, and the sudden torque may initiate a swing. A way of correcting this swing, much used when the Pup was in service, was to push the stick hard forward, thus bringing up the tail and imposing what there is of gyroscopic action to counteract the torque. However, with the steerable tail-skid this action is quite unnecessary and the landing is simple.

"Flight" photograph.

G.C Wheeler in the cockpit of his Pup. Note the padded-edge windshield and the airscrew-synchronized Vickers gun.

On one occasion, coming down to the Royal Aeronautical Society Garden Party in 1938, the pressure in the petrol tank was not keeping up and I had to pump it up by hand; normally the windmill pump does the job. At that time, unfortunately, the main engine switch was on the right-hand side, just where one's arm could touch when trying to use the hand pump, and in this way I switched it off accidentally. Having little height, I had not time to search round the cockpit to see what had happened and I naturally assumed that the low pressure in the tank was the cause of failure, so started to execute a forced landing from 700ft. I selected a field of ample proportions and level surface, and did the approved approach by "S" turns, followed by a gentle side-slip, and then landed just over the hedge, taking very great care in case I should not stop running inside the field. The Pup stopped in 18 yards, leaving between 500 and 600 yards of clear field in front of me!

Gliding turns and side-slipping are a joy, since one can go from one turn into another very quickly and still keep within 100 yards or so of one's landing point. One does come down rather steeply, though, due to the facts that the Pup is very light and that the drag, by modern standards, is high.

Taken all round, the Pup is a delightful little aircraft to fly, with one of the smoothest-running engines one could ever experience even to-day, excluding only jets. It has no vices and is, in fact, extremely easy to handle, but—and this is an important "but"—one has to land it, not just push it on the ground as one does with so many modern aircraft. Moreover, one has to "handle" the engine, and not merely open the throttle as one does to-day.

As related on this page, the Avro Canada Orenda turbojet, to power the CF-100 fighter, is being flight-tested at Malton, Ontario, in the outboard nacelles of this Lancaster "test-bed."

AIR-TESTING THE ORENDA

YET another Avro flying test-bed for a new gas-turbine design has begun its development programme—a Lancaster modified by Avro Canada, Ltd., to carry two of its new Orenda turbojets in the outboard positions. A powerful axial-flow unit, the Orenda has already accumulated hundreds of hours of successful ground-running. It was designed primarily as a power-unit for the Avro Canada CF-100, which, in prototype form (a second prototype is now finished), is powered by two Rolls-Royce Avons of comparable specification.

The test-bed aircraft was built during the war by Avro Canada's predecessor, Victory Aircraft. Fairings replace the nose and tail turrets and the machine has been "winterized" to permit long-range operation into northern bases for cold-weather testing.

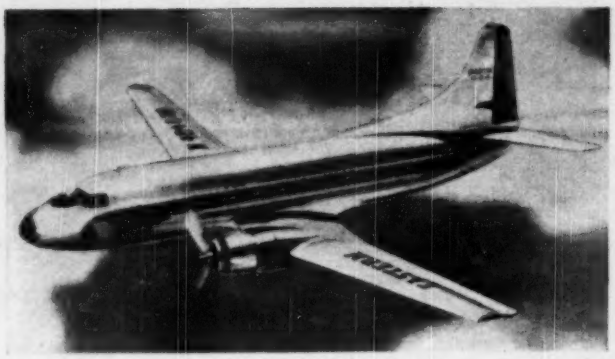
Test facilities of the Orenda-Lancaster consist of a test-observer's instrument panel at the navigator's position, and automatic observers in the rear fuselage, with the necessary controls and instrument-leads between the panel and observers and the new power installation.

Avro Canada states that the test-programme will be particularly concerned with proving the fuel system and thrust controls. Compressor efficiencies and the effects of acceleration will be checked, and the solidity of the turbojet's structure will be tested by a series of climbs, dives and turns.

Lancaster, Lancastrian or Lincoln test-beds have been employed to test almost every type of British gas turbine

AMERICAN NOTEBOOK

By
Stanley H. Evans,
F.R.Ae.S., A.F.I.Ae.S.



Glenn Martin have a comfortably filled " order-book for the 4-0-4, a 40-passenger, pressurized and lengthened version of the 2-0-2, a type which has had a somewhat chequered career.

MARTINS' RETURN

With wizard fleetness flashing over, under,
Bursts from the gloom the Spring's blue-breasted wonder.
("Vision of Spring": F. J. Deuss, 1920.)

ONE proverbial swallow "twittering from the straw-built shed" may not make a summer, but the poet and the ornithologist (and, possibly, an odd aircraft designer or two) might agree that 65 martins go a long way towards it. And when the Martins happen to be Type 4-0-4 winged transports worth some $35 million on the order-book, the count of 65 must produce quite a cheerful twitter in the counting-house of the Glenn L. Martin Co., of Baltimore, Md. Doubtless, in closing the biggest U.S. twin-engined transport deal in three years, some twittering was also felt in the breasts of Martin's competitors in this field—Convair and Douglas.

This $35 million deal for the Martin 4-0-4 comprises two airline transactions, 35 aircraft going to Eddie Rickenbaker's Eastern Air Lines and 30 to Howard Hughes' Trans-World Airline (T.W.A.) run by Ralph Damon. The new model 4-0-4 is a 40-passenger pressurized and lengthened development of the existing 2-0-2 model on which the Martin treasury has taken a very severe financial beating, only 31 being sold, of which 24 are in operation by Northwest Airlines. Due to inadequate prototype development, the 2-0-2 ran into a patch of bad luck, suffering a fatal wing structural failure in flight, with subsequent grounding for extensive and expensive alterations. However, these 2-0-2 losses have now been written off and the company are back in the black after a couple of very bad years in the red. In 1947-48, for example, the net losses totalled nearly $36 million, whereas last year's operations turned in a net income of $5.1 million.

Inasmuch as actual deliveries of the new model 4-0-4 will not begin until the spring of next year, T.W.A. in the meantime have made arrangements with Martin for the lease of 12 of the current 2-0-2 design, with delivery starting any moment now. As these 2-0-2s are delivered, they will supplant the slower pre-war Boeing Stratoliners in T.W.A.'s fleet. What will be the final nesting place of the 2-0-2s on expiry of the lease is problematical at this time, but since, presumably, the parts were already fabricated and the tooling was available, no doubt both parties to the deal were able to consummate a mutually satisfactory bargain.

Apart from pressurization—with cabin air conditioning designed for sea-level pressure at a cruising altitude of 12,000ft—the main engineering changes to be introduced into the 4-0-4 model will be an increase of gross weight to 43,000 lb and a 30-inch-longer fuselage to accommodate the extra row of four seats. (The 36-passenger 2-0-2 model is certificated for a gross weight of 39,000-40,600 lb, the higher figure being permissible with a wet-boosted take-off.) Power plant of the 4-0-4 will be two of the latest type Pratt and Whitney R-2800-CB16 18-cylinder twin-row radials, each normally rated at 2,100 h.p. and delivering 2,400 h.p. with water injection for take-off. Airscrews will be Hamilton-Standard auto-feathering, reverse-pitch, paddle-shaped three-bladers of 13ft 1in diameter.

Martin publicity pundits predict a top speed of 312 m.p.h. at 14,000ft for the 4-0-4. Seeing that the maximum speed of the 2-0-2, apparently with the same power output, is officially quoted as 311 m.p.h. at 14,000ft and 35,000 lb gross weight, the engineering analyst will no doubt be intrigued with this result—bearing in mind the higher gross weight of the 4-0-4 and the increase in wetted surface-area of its longer fuselage. A near-300 m.p.h. cruising speed has also been somewhat loosely reported in the U.S. aviation papers. Our own slide-ruling on the 4-0-4, based on a gross weight of 38,000 lb and a similar power output to that currently specified for the power plant of the 2-0-2 (namely, 1,690 b.h.p./engine at 14,000ft and 1,400 b.h.p./engine at 12,000ft), turns up a performance of 308 m.p.h. (maximum) at 14,000ft and 283 m.p.h. (cruising) at 12,000ft. (The corresponding minimum parasite drag coefficient is estimated at 0.021.) Since, however, no drag penalty has been charged against the longer fuselage, a more prudent estimate would bring down these figures to 305 and 280 m.p.h.

A pretty fair idea of the climb performance can also be assessed from the current 2-0-2 specification. With the wet-boosted take-off power of 2,400 b.h.p./engine and a permissible gross weight of 40,600 lb, the 2-0-2 takes off over a 50ft obstacle in 1,565ft and has an initial climbing rate of 2,200ft/min. If the take-off gross weight of the 4-0-4 is certified at 43,000 lb, the corresponding take-off gross run is increased to 1,750ft and the initial climb reduced to 2,000ft/min, based, of course, on the same power output as the 2-0-2. The 33,000ft full-power service ceiling of the 2-0-2 will drop off to approximately 30,000ft for the 4-0-4.

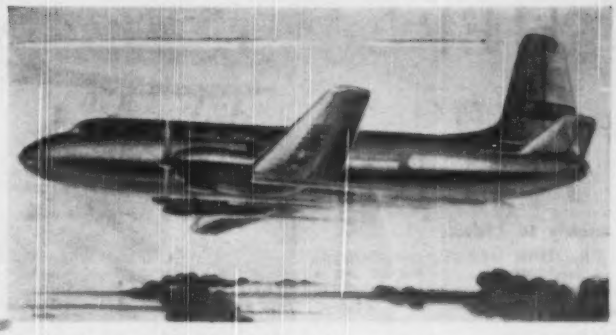
With a capacity payload of 36 passengers and baggage, plus 1,000 lb of cargo, the normal operating range of the 2-0-2, exclusive of reserve fuel for 200 miles plus 45 minutes, is officially quoted by Martin as 830 miles, while the maximum range with capacity fuel of 1,010 U.S. gallons and no reserves is given as 2,020 miles. The corresponding ranges for the 4-0-4, carrying 40 passengers, baggage and 1,000 lb of cargo, are estimated at 750 and 1,890 miles.

The certified stalling speed of the 2-0-2 is quoted as 76 m.p.h. at a landing weight of 38,000 lb, which is tantamount to a claim of practically 3.0 for the flap-down maximum lift coefficient. This is an unusually high value for partial-span flaps, but in view of the improved type of double-slotted flap design employed and the long span of these flaps extending over some 70 per cent of the wing span, it appears perfectly feasible. On this basis, then, the 4-0-4 may be expected to stall at around 79 m.p.h. at a landing weight of 41,000 lb, while the landing distance over a 50ft obstacle is estimated at 1,850ft, as against 1,720ft for the lighter 2-0-2.

Design for maintenance and serviceability start on the drawing-board and a detailed study of the Martin transport shows how well this aspect has been "designed-in" to cut down the ground time to a minimum. These virtues are much too numerous to detail in these notes, so a typical example seen in the structural treatment of the fuselage

must suffice. The cabin floor is constructed of removable honeycomb-sandwich-type panels forming an integral part of the fuselage structure; thus the portion below the floor is little more than fairing, allowing the installation of large servicing hatches in the bottom skin without the addition of heavy structural reinforcements. In this manner, the flight control, hydraulic, electrical and cabin-heater systems, and cockpit instruments, are easily accessible from the ground, eliminating the need for mechanics to enter the cabin.

As if to ward off the death-rattle of the piston-engine for as long as possible, Martin's say: "The 4-0-4 will be the first production airliner designed and stressed for conversion to turboprop engines, when such latest type power plants are released by the Military Services for commercial use, *expected within three to five years.*" (Italics are the writer's). The first part of this statement—in so far as American manufacturers are concerned—may be disputed by Convair, but it may be true for all that, for it will be recalled that Martin prepared a design study of a turbo-propped transport for United Air Lines in 1946. This was to have been the pressurized 3-0-4 model, designed around the General Electric TG-100 (XT-31) engine, but the scheme fizzled out when the engine development came to a dead-end.



An artist's impression of the 3-0-4 model which was to have been Martin's bid for the first post-war turbopropped airliner, powered with General Electric TG-100s. Engine development fizzled out, however, and this particular Martin failed to hatch. The 4-0-4 may be turbopropped later with Allison T-38s.

As for the wistful pessimism implied by the italics, one is inclined at first to discount such a protracted engine "bug hunt" in the light of the recent General Motors-Convair deal with the Allison XT-38 turboprop. Surprisingly, however, both Douglas and Lockheed recently issued public statements to much the same effect. Donald Douglas told his stockholders that company engineers had been discussing with the airlines the possibility of turbopropping the DC-6, a conversion which might be expected to increase the cruising speed from 300 to 360-380 m.p.h., while reducing seat-mile costs to 30 cents. "But," said Douglas, "we don't have an acceptable turboprop engine at an acceptable price available now." Moreover, he estimated it might be four years before turbopropped transports are put into commercial operation.

Lockheed, too, in announcing an order from Eastern Air Lines for 10 new Super-Connies, with an 18ft longer fuselage design seating a maximum of 110 passengers, estimate that it will be three or four years before this new model will be equipped with Allison turboprops. All these dolesome predictions of to-day are completely at variance with yesterday's publicity claims in the American Press on behalf of the Allison XT-38 and XT-40 turboprops. Our own personal feeling is that once the turbopropped Convair-Liner gets around the country on its shakedown tour, things will begin to move at a more typically American tempo.

Nonetheless, with a backlog of undelivered orders now running at around $92 million and prospects for additional new commercial contracts promising, the Martin company has pulled out of the financial and technical gloom of the immediate post-war years. A large share of the credit for this resurgence is undoubtedly due to the new and spirited leadership of C. C. Pearson, late of Douglas (who was brought in by the Martin Board for just that purpose), ably assisted on the manufacturing side by our old ex-Gloster colleague Tom Willey—one of the best aircraft engineers who ever left a drawing-board in England to find well-earned promotion to a directors' board in America. Anyway, until such time as the Convair cuckoo comes home to roost, things look cheerful in the Martin's nest.

R.Ae.C. AVIATORS' CERTIFICATES

A RECENT R.Ae.C. list of Aviators' Certificates, covering the period from March 28th to May 11th, 1950, shows a total of 62 certificates awarded. The previous list (January 23rd to March 27th) was published in *Flight* of April 13th.

No.	Name	Club or School	Date
26,432	John Peake	Cowes Aero Club	28.3.50
26,433	Gerrard Copping	R.A.F. College, Cranwell	30.3.50
26,434	Charles Stewart Spence	Qualified Service Pilot	31.3.50
26,435	Ronald Lee	Air Service Training	31.3.50
26,436	Abdul Gaphar Nour	Air Service Training	31.3.50
26,437	Kenneth Tempest	Exeter Flying Club	31.3.50
26,438	Arthur Fraser Fish	Qualified Service Pilot	31.3.50
26,439	Anthony Rex Scott	Qualified Service Pilot	31.3.50
26,440	James Edward Futcher	Cowes Aero Club	31.3.50
26,441	Leon-Jacques Agobert	Qualified Service Pilot	5.4.50
26,442	Robert Ernest Arthur McCulloch	Qualified Service Pilot	5.4.50
26,443	William James Routledge	Border Flying Club	5.4.50
26,444	Douglas Grey	Airways Aero Club	14.4.50
26,446	Leslie George Frederick Hewitt	Boston Aero Club	17.4.50
26,445	Leon Castell Hudson	Airways Aero Club	17.4.50
26,447	Denys George Howard	Denham Flying Club	17.4.50
26,448	Christopher Joseph Capell Morley	Service Pilot U/T	17.4.50
26,449	James Oliver	Tees-Side Flying Club	17.4.50
26,450	Robert John Cormican	Airways Aero Club	17.4.50
26,451	Raymond Horace Morley	Qualified Service Pilot	17.4.50
26,452	Ronald Raymond Crayton	Qualified Service Pilot	17.4.50
26,453	John Frederick Roy Mitchell	Boston Aero Club	17.4.50
26,454	John Cameron	Qualified Service Pilot	17.4.50
26,455	Andrew Thomas Alexander Mac-Donald	Qualified Service Pilot	17.4.50
26,456	Thamakundala Veeraswamy Kannabiran	Marshalls Flying School	17.4.50
26,457	Charles F. Hase	Plymouth District Aero Club	19.4.50
26,458	John William Beazley	Qualified Service Pilot	21.4.50
26,459	George Walter Smith	Qualified Service Pilot	25.4.50
26,460	David Herapath Tinker	Service-Pilot U/T	25.4.50
26,461	Henry Norman Gregg	Coventry Aero Club	25.4.50
26,462	Reginald Arthur Paterson	Luton Flying Club	24.4.50
26,463	Philip Guy Murton	Qualified Service Pilot	24.4.50
26,464	Harold George Brittain	Qualified Service Pilot	24.4.50
26,465	Dan Gordon Miller	Wiltshire School of Flying	24.4.50
26,466	Graham Gordon Ayorst Davies	Qualified Service Pilot	25.4.50
26,467	John Cooper	London Aeroplane Club	25.4.50
26,468	Eric Barrett	Qualified Service Pilot	25.4.50
26,469	Harry Albert Ruddy	Service Pilot U/T	27.4.50
26,470	Arthur Thomas Lewis	Hampshire Aeroplane Club	27.4.50
26,471	Arthur Lionel Bennett	Service Pilot U/T	27.4.50
26,472	Robert Henry Plesco	Service Pilot U/T	28.4.50
26,473	Edward Alexander Franklin	Service Pilot U/T	28.4.50
26,474	Peter Charles Poling	Qualified Service Pilot	29.4.50
26,475	John Frederick Smith	Northants Aero Club	29.4.50
26,476	Edward John Pusey	Service Pilot U/T	29.4.50
26,477	Eric John Finch	Qualified Service Pilot	29.4.50
26,478	Anthony Henry Leslie Barlow	Wolverhampton Aero Club	2.5.50
26,479	Philip Henry Boileau Lavallin	Qualified Service Pilot	3.5.50
26,480	Desmond Cockburn Dickinson	Denham Flying Club	3.5.50
26,481	Bartholomew Hynes	Denham Flying Club	3.5.50
26,482	Edward John Farrow	Redhill Flying Club	3.5.50
26,483	Brian Hamilton Gadrington Nation	Qualified Service Pilot	3.5.50
26,484	John Francis Dodman	Cowes Aero Club	5.5.50
26,485	Duncan Andrew Gillies	Qualified Service Pilot	5.5.50
26,486	Leslie Jackson	Qualified Service Pilot	5.5.50
26,487	Jindrich Petr Skirka	Qualified Service Pilot	5.5.50
26,488	Philip Melvyn Diesbach	Southend Flying School	5.5.50
26,489	John Frederick Grummett	West Riding Aviation Centre	8.5.50
26,490	Sidney William Rohan-Wills	Qualified Service Pilot	8.5.50
26,491	Clifford Albert Cornford	Qualified Service Pilot	8.5.50
26,492	George Colin Mower	Nottingham Flying Club	8.5.50
26,493	Po Po Kyaw	Air Service Training	11.5.50

HERE and THERE

Quickly to Lisbon

MR. JOHN DERRY, the de Havilland test pilot, last Sunday flew a Vampire 5 from Hurn to Lisbon—where he was to give a demonstration the next day—in 2 hr 14 min. His average speed for the journey was approximately 380 m.p.h.

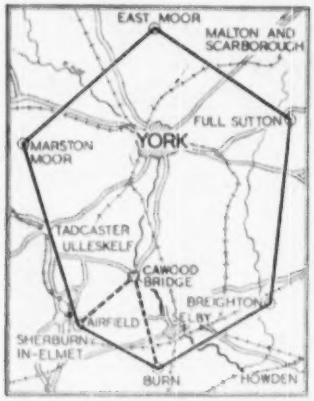
Coventry Air-race

BAGINTON, near Coventry, is to be the venue for this year's Siddeley Challenge Trophy contest. The city of Coventry has taken the opportunity to turn the occasion—Saturday, September 2nd—into a full-scale air day. It will be under the aupsices of the Coventry Corporation, the Royal Aero Club and the Coventry Aeroplane Club.

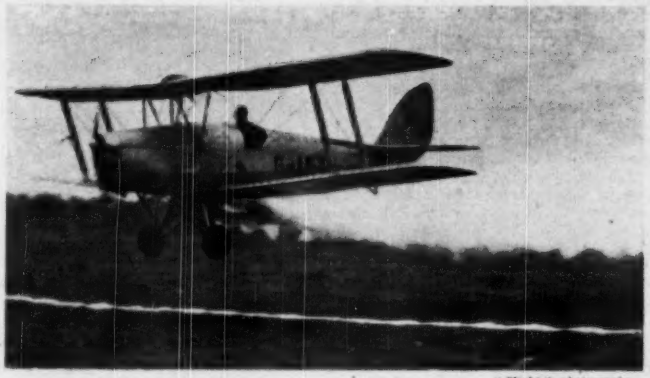
Balliol Abroad

A BOULTON PAUL Balliol T.2 advanced trainer, as now in service with the R.A.F., recently completed a successful demonstration tour of the Middle East. During the trip it visited Cairo, Baghdad, Damascus and Beirut; it was flown by officers of the Egyptian, Iraqi, Syrian and Lebanese air forces.

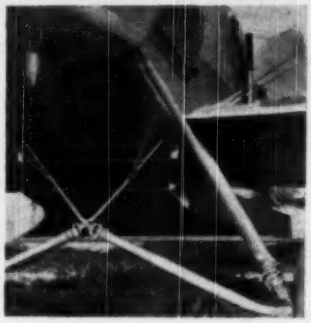
There were no untoward incidents during the journey and no replacements were required for the airframe or the Rolls-Royce Merlin power-unit. Temperatures as high as 110 deg in the shade (in Iraq) caused no ill effects; in fact, coolant replacement was not necessary at any time.



RACE-COURSE: This six-sided, 100 km circuit is the course for the S.B.A.C. and Air League Challenge Cup races to be held at Sherburn-in-Elmet, Leeds, next Saturday (see paragraph overleaf). The smaller course is for the Yorkshire Aeroplane Club's race for light aircraft, to be held on the same day. The racing programme, which begins at 2 p.m., is being supplemented by an air display.



"Flight" photographs.



HEDGE-HOPPER: The company of Spray and Win, Ltd., recently demonstrated at Panshanger the capabilities of their Tiger Moth converted for crop-dusting. Flying at 8ft in still air, the aircraft is claimed to cover 100 acres in an hour. On the left is shown the dusting equipment (of a type developed in America), consisting of a venturi beneath the fuselage fed with insecticide from a hopper in the front cockpit.

A slight reduction in the number of pages in "Flight," and some delay in reporting events, continue to be unavoidable as a result of the withdrawal of overtime working by a section of the printing industry.

First A.T.C. Solo?

PROBABLY the first A.T.C. cadet to fly solo under the new Air Ministry flying scholarships scheme is Sgt. S. I. Turner, of No. 981 Squadron, who is under the tuition, at Strathtay Aero Club, of Mr. David Kay, the C.F.I. Sgt. Turner, who is 17, began training during the week-end of July 1st-2nd. The following week-end, on July 10th, he flew solo after receiving a total of 6hr 15min dual instruction. The new scheme provides for 200 cadets to be trained to the private-pilot's-licence stage each year.

New Power Units

SOME brief details have been officially released of new types of gas-turbine power units. The latest mark of de Havilland Goblin turbojet is designated DGn. 5, and mention is made of the Rolls-Royce Avon RA.3. The Armstrong-Siddeley Python ASP.1 and ASP.2 turboprops develop, respectively, 3,670 h.p. and 4,100 h.p.; a new Armstrong-Siddeley turbojet is the Viper ASV.1, which produces 1,500lb static thrust. This unit is a short-life, experimental version of the Adder, which is in turn a pure-jet development of the Mamba turboprop.

Ambassador Mishap

WHILE landing at Hurn last week, the first production Airspeed Ambassador suffered failure of a link in the starboard undercarriage leg. Its fuselage under-surface, starboard nacelle and starboard airscrew were damaged, but the aircraft withstood the impact so well that it was able to be flown back to Christchurch for repairs a few days later.

Australian Appointment

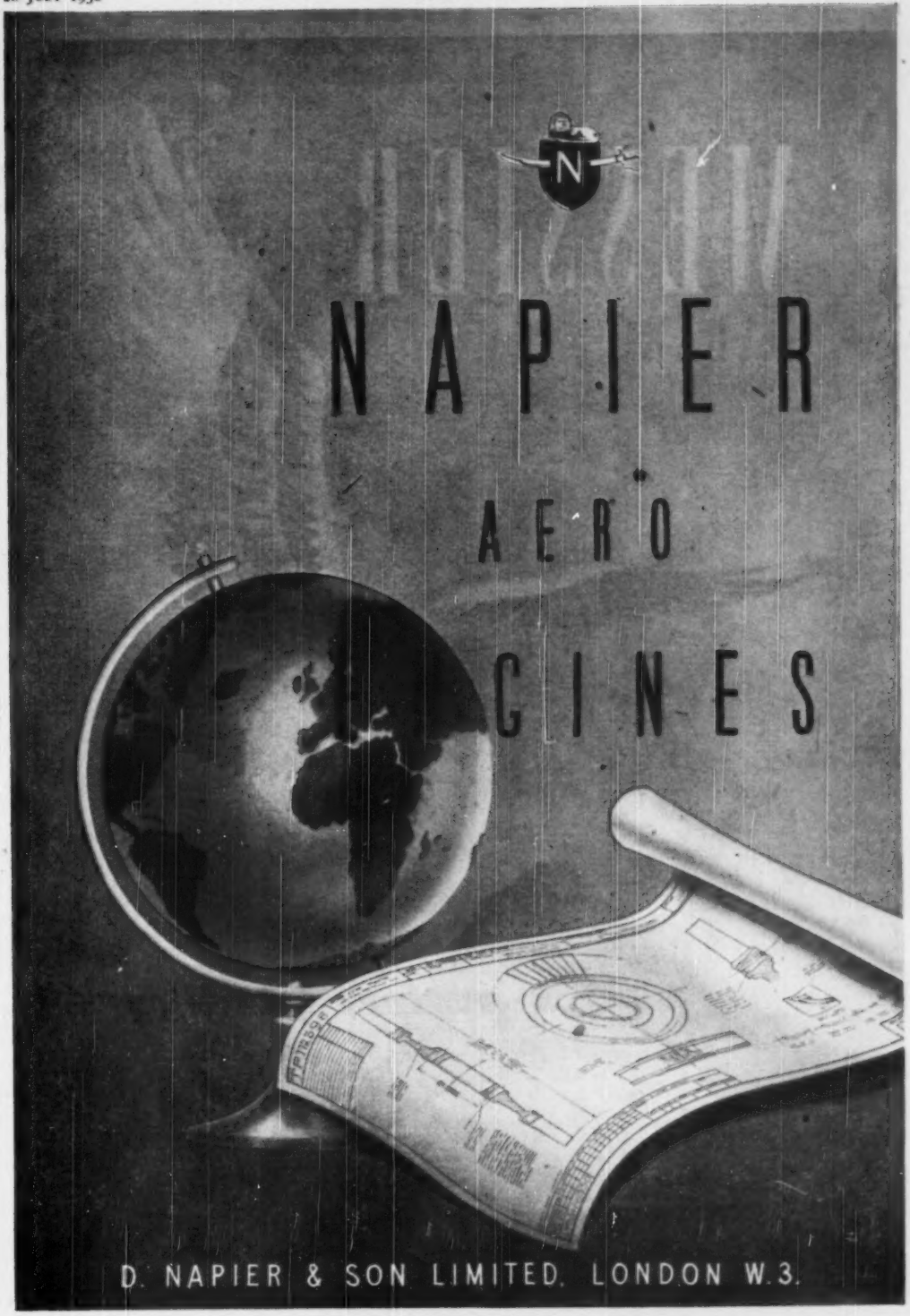
IT is announced that Mr. Hanford Stevens, who hitherto has been United Kingdom representative of the Aircraft Production Division of the Australian Department of Supply, has now been appointed senior representative, in London, of the Department. He will remain actively interested in aircraft production matters, but in view of the wider scope of his responsibilities, he will be assisted in this particular sphere by Mr. Charles A. Weetman, formerly of Melbourne.

Mr. H. Stevens.

To Australia by Gemini

AFTER flying to Melbourne from England recently, Mr. Tony Vigano, a restaurateur, wrote of his aircraft: "The Gemini behaved perfectly all the way . . . . She cannot be bettered for a private owner and surely this 14,000-mile trip has proved it." Mr. Vigano was accompanied by Mr. Arthur Barnard, a former pilot in the Fleet Air Arm. During the flight they landed at 43 airfields in 20 different countries.

Like Capt. Bradshaw's Proctor (mentioned overleaf) the Gemini was supplied by W. S. Shackleton, Ltd., of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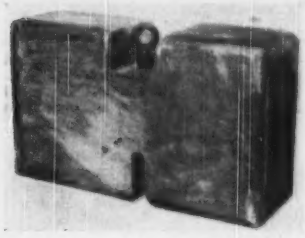
HERE AND THERE . . .

London. Only once before, it is thought, has the England-Australia journey been made by a Gemini. The pilot on that occasion—early in 1947—was G/C. Bandidt, now sales manager of Handley Page (Reading), Ltd.

Kemsley Race Entries

ENTRIES for the Kemsley Trophy Race (Fairwood Common, Swansea, August 19th) are announced by the R.Ae.C. as follows (names are those of the pilots): C. J. de Vere (Hawk Trainer), D. C. Jemmett (Hawk Trainer), F. Dunkerly (Gemini Ia), W. I. Lashbrook (Proctor I), J. N. Somers (Gemini III), C. G. Alington (Sparrowhawk), Lt.-Col. D. S. Fanali (Fiat G-46) and Neville Duke (Hurricane 2c). Lt.-Col. Fanali, who is competing in several other events in the National Air Races series, is Italian Air Attaché to this country.



AVOIRDUPOIS: Claimed to be the largest lead weight produced for the aircraft industry, this precision-made, 2½-ton block was recently delivered to the de Havilland Aircraft Company from the London works of Grey and Marten, Ltd.

Saturday's High-speed Race

SO that competitors can attempt to set up a new world record for the 100-km closed circuit, the S.B.A.C. Cup race will be flown (at Sherburn-in-Elmet next Saturday, July 22nd) round a six-sided 100-km course. Four aircraft will take part—a Hawker Sea Hawk (Trevor Wade), Vickers-Supermarine Attacker (M. Lithgow), Gloster Meteor 7 (J. Zurakowski) and D.H. Venom (John Derry). On p. 94 is a map of the course.

The present record of 605 m.p.h., set up by Derry in a D.H.108, seems unlikely to be beaten by a wide margin—if at all. Both the Attacker and Meteor held the closed-circuit record before their speeds were exceeded by the 108; the Venom and Sea Hawk, both standard fighters as compared with the record-holding research aircraft, are therefore the only "unknown quantities." The Hawker P.1052 or P.1081, or the Supermarine 510, would have been more likely to exceed 605 m.p.h. "round the sticks."

NEW LIFE: This Percival Mew Gull, piloted by Alex Henshaw, won the 1938 King's Cup at the record speed of 236 m.p.h. Mr. H. E. Scrope, its new owner, recently flew it to Blackbushe from France (where it had lain unserviceable for many years) for an overhaul, by Personal Plane Services, prior to resumption of its racing career

NEWS IN BRIEF

UNTIL the end of this month, B.T.H. electrical equipment for aircraft is the subject of a special window display at the makers' London offices at Crown House, Aldwych.

* * *

Teddington Controls, Ltd., Cefn Coed, near Merthyr Tydfil, South Wales, state that their engineers are now making personal visits to many firms in the industry for consultation on the mounting requirements for the motorized gate-valve which the company is developing.

* * *

E. D. Wynn and Co., Montpellier Drive, Cheltenham, who are A.R.B.-approved stockists of aircraft instruments and electrical accessories, now have A.I.D. approval also, and British and American equipment can be despatched immediately from their new bonded stores. Included in the transport fleet, for making urgent deliveries, is a Hornet Moth. The firm has recently organized a scheme by which, to assist all R.Ae.C.-affiliated clubs, items of equipment can be supplied at half price.

In connection with its sports day on July 8th the Pulsometer Engineering Co., Ltd., Reading, celebrated 75 years of existence. In 1875 it produced a revolutionary new steam pump: today its many products include tank-fitting fuel-booster pumps, extensively used in military and large civil aircraft.

* * *

G/C. R. J. F. Barton, O.B.E. has been appointed managing director of Air Service Training, Ltd. He established A.S.T. as an aeronautical training centre in 1931 and was commandant and sole resident director from that date until July, 1949, when three more members of the staff were appointed to the board.

* * *

As mentioned in these pages on July 6th, Capt. A. Bradshaw recently flew from England to New Zealand in a Percival Proctor V, standard except in its fuel capacity. It is learned that Capt. Bradshaw, a former Skyways pilot, will—among other commitments—operate the New Zealand agency for Cellon aircraft finishes.

KELLETT HELICOPTER TRANSPORT

The Kellett Aircraft Corporation has produced this mock-up of the KH-2A—a projected 12-16-passenger helicopter, powered by two Wright C7B6 radials in external nacelles. A development of the XH-10 military helicopter, the KH-2A is expected to have a maximum speed of 115 m.p.h., range of 200 miles and a gross weight of 14,142lb, with 3,300lb payload. Folding rotors will be fitted.

A NEW HANNIBAL

Naming the Flagship of B.O.A.C.'s Hermes IV Fleet : Fame of an Earlier H.P. Type Perpetuated

Lord Pakenham christens the flagship of B.O.A.C.'s Hermes IV fleet R.M.A. *Hannibal*. Thus, the tenth production H.P.81, G-ALDI, perpetuates the illustrious name of Imperial Airways' 1930 four-engined H.P.42 biplane G-AAGX.

"Flight" photograph.

TUESDAY, July 11th, was a great day for the Handley Page Company and for B.O.A.C. At London Airport Lord Pakenham christened the first flagship of a fleet of 25 Hermes IVs in readiness for the new services which this first British modern post-war airliner is to operate. Following the naming ceremony, during which South African wine was poured over the aircraft's nose and the name *Hannibal* was unveiled, flights were made by Lord Pakenham and Sir Miles Thomas (accompanied by Sir Frederick Handley Page) and also by officials of the Ministries and Corporation and many of the guests.

In the name *Hannibal* an outstanding class of early Handley Page aircraft is perpetuated. The old H.P.42s were among the first four-engined airliners to operate,* and were described as "daringly advanced in design" when they first flew in 1930. *Heracles* was used on the European services and the *Hannibal* on the Empire routes, and the two differed only in interior furnishings. Eight of the aircraft were built, and each flew some 12,000 hours, achieving a total fleet mileage of over 10 million miles.

The names for the other Hermes IVs in the fleet, in addition to *Hannibal* and *Heracles*, will be as follows:—*Hamilcar, Hecuba, Hebe, Hermione, Hanno, Hadrian, Horsa, Horatius, Hengist, Helena, Hector, Hero, Horus, Heron, Homer, Herodotus, Hesperides, Hestia, Halcyone, Hera, Helios, Hyperion, Honor.*

It is interesting to recall that the pilot of *Hannibal* on the demonstraion flights at London Airport, Capt. A. S. M. Rendall, flight superintendent of B.O.A.C.'s Hermes fleet at Hurn, flew as first officer on the H.P.42 biplane of the same name during his service with Imperial Airways.

At a luncheon following the naming ceremony, the toast of "British civil aviation" was proposed by Sir Miles Thomas, D.F.C. The function was one of peculiar significance, he said, in that the Hermes would be the first all-British post-war civil aircraft, expressly designed as such, to come into operation on B.O.A.C. routes. He believed that it would be popular with passengers and also that the British public would appreciate the importance of its introduction as the forerunner of other modern competitive all-British aircraft which B.O.A.C. would be flying in years to come. Sir Miles recalled the association of Sir Frederick with British commercial aviation from its very beginnings 31 years ago, when Handley Page Transport, Ltd., was one of the first companies to start operating.

Both Lord Pakenham and Sir Frederick Handley Page replied. The former said that he thought credit was due not only to Sir Frederick but also to the Ministry of Supply. It was a great day for British aviation, and especially for Sir Frederick, whom he described as "the dean" of civil aviation. (To this Sir Frederick rejoined, later, that he was not considering taking Holy Orders at present: he was more interested in other kinds.) The Minister was looking forward to entrusting himself to the Hermes on a flight to Africa in a few weeks' time.

There was no doubt that we had had to pay a certain price for having speeded ahead with the organization of our air services after the war, but he thought we were right.

Sir Frederick Handley Page, C.B.E., traced the Corporation's beginnings back some 31 years to the time when Lt.-Col. Sholto Douglas (as he then was) was chief pilot of the world's first regular passenger airline over the Channel. A vital reason why he, Sir Frederick, was happy that B.O.A.C. should be the first airline to have the Hermes was the knowledge that the aircraft would be operated by a corporation with a superb record of safety and with the airmanship of its crews, and its engineering background, unexcelled.

The Hermes could have been in service last year, said Sir Frederick, if an interim type of aircraft had been accepted, but a builder had not merely to design, develop, test and perfect a structure, he had to incorporate power plants and electrical and hydraulic equipment and air-conditioning plant and other apparatus so necessary to passenger comfort. All of this made by other factories, and representing over half the value of the aircraft, had likewise had to be designed and developed in the post-war years. In the Hermes was equipment designed specially for the aircraft and never before installed. It was the first large British civil aircraft to embody a pressurization and air-conditioning system that included humidification and refrigeration, while its high-voltage alternating-current distribution system was the first of its kind to be used in civil aircraft. The development work by specialist sub-contractors had proved a longer task than was originally anticipated.

In the normal course of operational development it was expected that the Hermes would later be permitted to carry a greater payload. Sir Frederick said he was expecting the H.P.81 Hermes to achieve the impossible—an even finer record of safety, reliability and comfortable service than that of the old H.P.42s. He hoped it would help to reduce what he believed was called the "target deficit" and eventually help to turn it into a "target profit." When this happened, Sir Frederick added, he would begin to believe in nationalization.

Some Facts About the Hermes

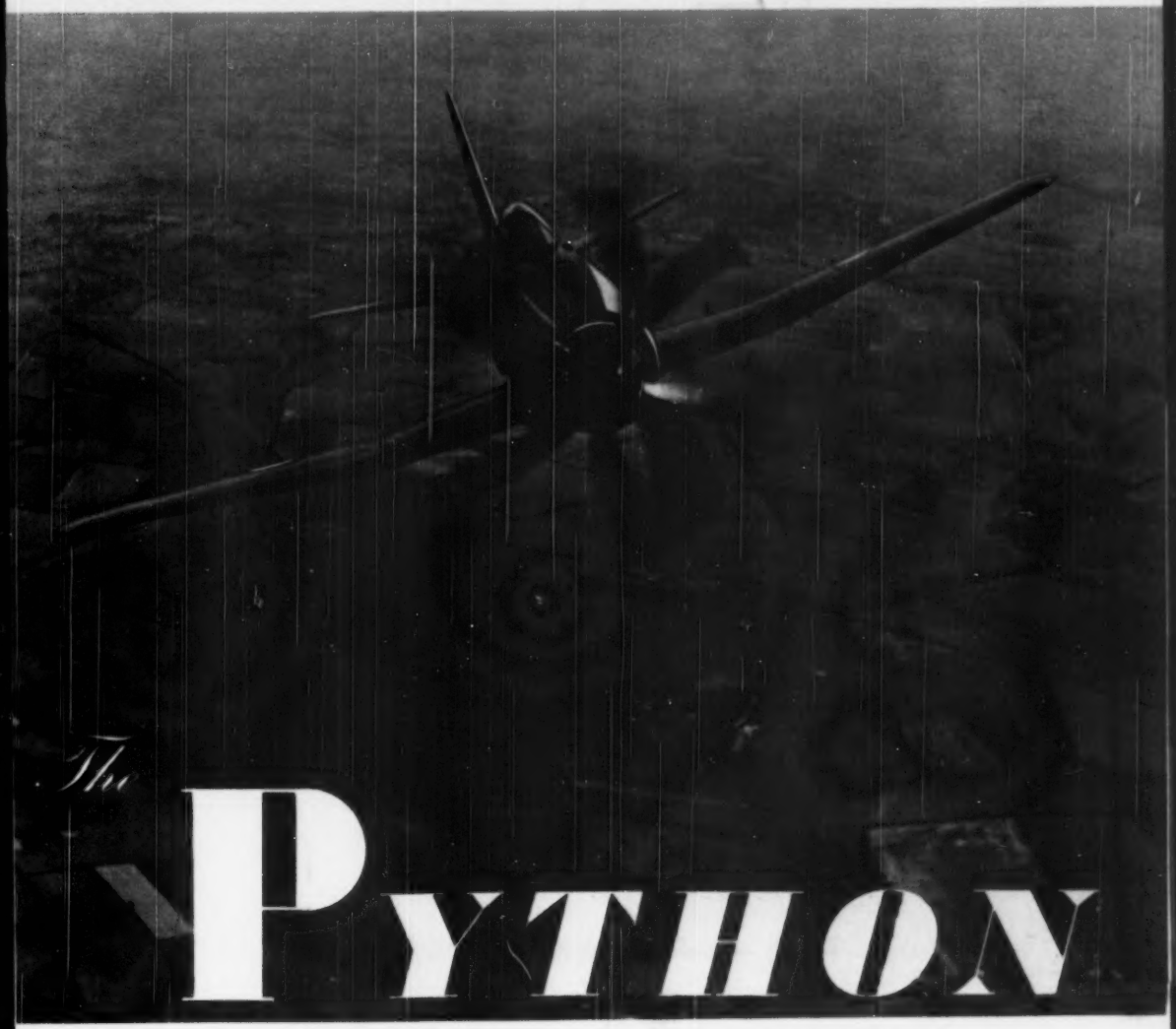
In the form in which the Hermes will go into service with B.O.A.C. it has accommodation for 40 passengers, the fuselage being divided into two cabins, each seating 20. Ladies' and men's toilet compartments are located at the rear of the aircraft, and additional toilet facilities are found forward of the front cabin. There is a large wardrobe just ahead of the entrance door, and a spacious and well-equipped galley—probably the best of any aircraft now in service—located between the crew section and the front cabin. A folding bar can be erected in flight across the main entrance door to facilitate the serving of drinks. The B.O.A.C.-designed seats, made by Vickers, have adjustable headrests and the seats themselves are adjustable from upright to near-reclining attitude. The movement is somewhat unusual, entailing a forward and downward motion on slides. The advantage is that the fully reclined position involves no inconvenience to the passenger immediately behind. Folding wooden tables are carried in pockets in the back of each seat.

To the passenger the cabins will appear unusually light and spacious, and the window size is generous for a high-altitude, pressurized aircraft. In *Hannibal* the noise and vibration levels are comparable with, and in most cases lower than, those of piston-engined aircraft now in operation on the world's routes, and it is understood that when the vee-rod modification

(Concluded on p. 110)

* The Dorn or Super-Wal (four Jupiter VIII's) and Junkers G-38 were flying.

WORLD'S MOST POWERFUL NAVAL STRIKE FIGHTER



The PYTHON

propellor turbine

the world's most powerful prop-jet in production powers the Westland Wyvern which has just successfully completed its first deck landing trials on an Aircraft Carrier.

ARMSTRONG SIDDELEY MOTORS LIMITED

Member of the Hawker Siddeley Group

Coventry

The most widely adopted jet fighter in the world

DE HAVILLAND VAMPIRE

de Havilland Goblin engine

Lt. Cdr. G. R. Callingham brings in the Fairey 17 for its first deck-landing on H.M.S. *Illustrious*.

NAVAL NEWCOMERS

The Fairey 17, Blackburn Y.A.5. and Westland Wyvern

ALTHOUGH the new Fairey 17, which recently made its first deck-landing, is still subject to certain security restrictions, even a superficial inspection shows that the aircraft displays many ingenious features. The upper photograph shows the first landing: both the Double-Mamba-driven co-axial airscrews are running, but the Fairey 17 is virtually a twin-engined aircraft and is capable, if necessary, of landing with only half the power-unit running; or, for that matter, of flying on one airscrew to extend the range so vital to effective anti-submarine operations.

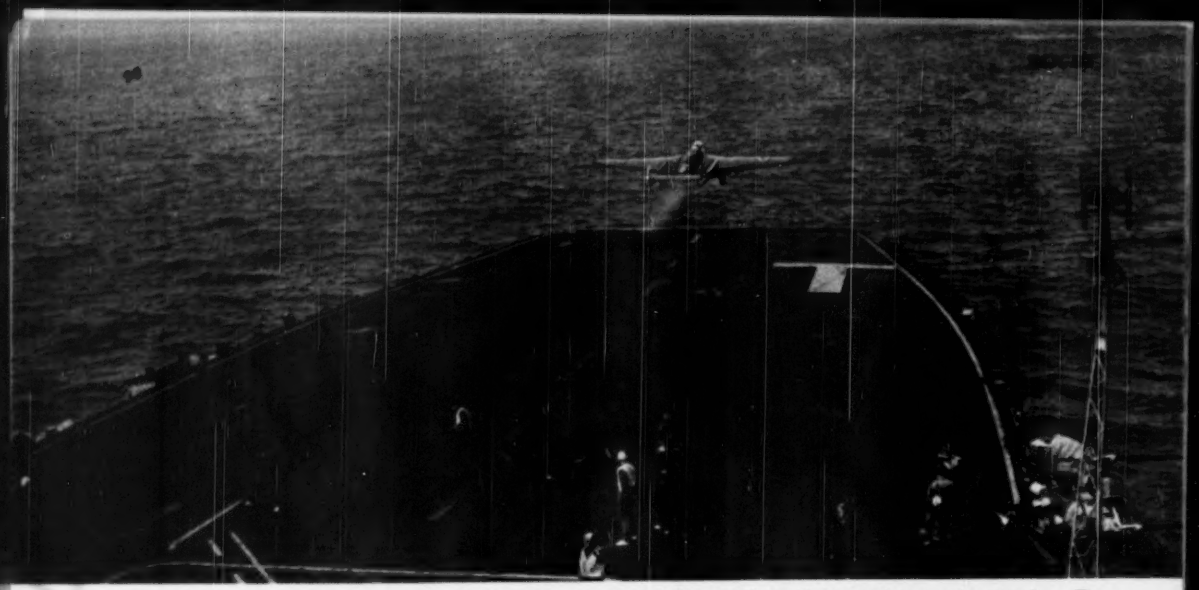
A short, sloping nose gives excellent visibility for search purposes. The tricycle undercarriage layout has a double-wheel nose-unit. Slow-flying qualities should be enhanced by the generous area of the wings (mechanically folding) and Youngman-type flaps. A sting-type arrester hook is seen extended, and the ventral blister for the radar scanner may be glimpsed.

Another new Naval aircraft illustrated here is the Blackburn Y.A.5—an anti-submarine type built to the same specification as the Fairey 17. To allow flight testing to proceed, a Rolls-Royce Griffon was installed in place of the Double Mamba awaited for service use, and with this provisional power-unit the Y.A.5 completed its initial deck trials some months ago. Meanwhile, good progress has been made with the Double-Mamba-powered version.

The *Flight* photograph of the Westland Wyvern T.F.2 at the foot of the page affords a direct comparison with the other new Naval types. The Wyvern is powered by a second Armstrong-Siddeley turboprop—the 3,650 h.p. Python, most powerful unit of its kind to go into production. The Navy has ordered Wyverns for strike duties—torpedo-dropping, bombing, rocket-firing and strafing—and in this role it will be a welcome addition to Britain's Naval air power. Older and slower Firebrands, in limited numbers, are the only comparable machines in service.

(Above right) The Blackburn Y.A.5, seen in Griffon-powered form, was built to the same anti-submarine specification as the Fairey 17.

Westland's Wyvern T.F.2 (Armstrong-Siddeley Python) is seen landing. In the cockpit is Harald Penrose, the manufacturers' chief test pilot.



As one Sea Vampire becomes airborne, the deck-crew prepares to marshal a second aircraft into position on the catapult. The strops used to connect the Vampires to the catapult are "expendable"; one of them can just be discerned falling away into the sea.

DECK-LANDING VAMPIRES by NIGHT

An Eye-witness Account of a Successful Experiment

By CHARLES GARDNER

On the day preceding the night trials, the author of these notes happened to be in H.M.S. "Theseus" to watch Naval V.R.s on annual training, and he was invited to stay and watch the trials. Shortly afterwards, a "Flight" representative who visited "Theseus" saw more day operations by Vampires, and his notes form the postscript; the accompanying daylight photographs were taken on this occasion.

SOMEWHERE round about 11 p.m. on the night of Monday, June 19th (apologies to the historians for not noting the exact time), two Sea Vampire 20s of No. 702 Squadron, Naval Aviation, made uneventful night landings on the two-hundred-yards-long deck of H.M.S. *Theseus*,* a light fleet carrier, steaming some 20 miles south of the Isle of Wight.

These were the "first-ever" night deck-landings by jet aircraft in or around Britain, although successful experimental flights have been made by the United States Navy. Our own trials were made with so little fuss and bother that certain people in *Theseus* (including, it is alleged, some visiting R.A.F. officers from Tangmere) didn't even know about it until the next morning. How they slept through the clatter of arrester wires being pulled out, the whine of jets, and the hearty thwank of Vampire arrivals on deck, I can't fully explain. It certainly wasn't through *mal-de-mer*—there was a flat calm. Perhaps the nerve strain of the afternoon, which had been given over to the landing-on of No. 1832 R.N.V.R. Squadron's Seafires for annual training, was conducive to later deep slumbers. Not that No. 1832 were involved in any "incidents"—indeed, all their aircraft got down successfully, and mostly at first shot—but, when watching out-of-practice and spare-time pilots doing their first deck landings for a year (and in some cases for several years) some little nervous energy is absorbed, especially by tyro watchers in the side galleries, or even on the armoured "island."

However, with the Seafires safely gathered in, the two Vampires, which had flown in from Ford during the afternoon, were brought up just before dusk, and placed on the bow, near the catapult position. Catapulting was obviously going to be necessary, as *Theseus* (18,000 tons, speed 25 knots) could not produce the necessary wind speed over a 200-yard deck to allow a Vampire to do a normal take-off, especially at night. There was, in fact, practically no "natural" wind, and so, with *Theseus* at full speed, the deck wind throughout the flying never rose above 28-30 knots as indicated at the "batsman's" position.

The pilots—Lt. A. B. B. Clark, R.N. (commanding 702 Sqn.) and Lt. N. Perrett, R.N. (Flight Commander)—made a Mae-Wested appearance just at last light and, while there were still streaks of silver left in the western sky astern, the Goblins were started. Both engines produced a length of flame on ignition, but it was quickly swallowed back as the revs built up, leaving the jet orifice a dull whitish glow when seen from directly aft.

Lt. Clark was first away. His Vampire was assisted by a deck-handling party on to the launching position, from which about 96 feet of propulsion builds up a still-air speed from nought knots to about 65 knots, and hurls the aircraft over the bows.

On the launch Clark gave full throttle, which made all heads peeping up from the galleries duck and turn to miss the hot jet stream; and then, with a "whoosh," the Sea Vampire was with us no longer, but was a rapidly diminishing and steadily climbing triangle of lights, with, it seemed to me, the jet orifice just visible up to some four or five hundred yards away; but I wouldn't be precise on the point. The take-off, incidentally, was straight into the darkest part of a generally dark sky, with only a sliver of obscured moon. As soon as Clark was off and circling, Perrett joined him in an identical departure, and both aircraft orbited gently at about 1,000 feet, using up fuel to "reduce" to landing weight.

The catapult drill, incidentally, was controlled by the officer in charge waving a greenly illuminated wand; a series of turns round and round his head indicated to the pilot that the time had come for full throttle.

The first landing was made by Clark. Using the current clockwise low-circuit approach, the Vampire came downwind off the port side of *Theseus*, while the batsman's spotters

**Captain A. F. Bolt, D.S.C. and Bar, R.N.; Commander Flying, Cdr. F. H. E. Hopkinson, D.S.O., D.S.C., R.N.*

reported "hook down, flaps down, wires up, affirmative, out"—meaning that:—

(1) The Vampire's long tail hook was lowered (I think the aircraft has a special light to indicate this, but the spotter had the benefit of glasses, which I hadn't).

(2) That the arrester wires were pushed up from the deck.

(3) That the green "affirmative" light was shining on the traffic lights attached to the "island."

These traffic lights, I was told, were genuine of their species, and originally came from a Sauchiehall Street crossing in Glasgow. The "red" and "amber" settings are both used in their turn—and presumably an aircraft receiving an "amber" has to put out its sky-hooks and dwell a pause. Anyway, all was clear and green for the Vampire, which completed its approach turn about 400 yards astern, and about 80 feet above the level of the round-down. The batsman, using illuminated bats, delivered himself of various acrobatic signals indicative of one wing a little low, and then he coaxed the Sea Vampire on, until it arrived about 15 or 20 feet above the round-down and pointing nicely down the centre line of the deck.

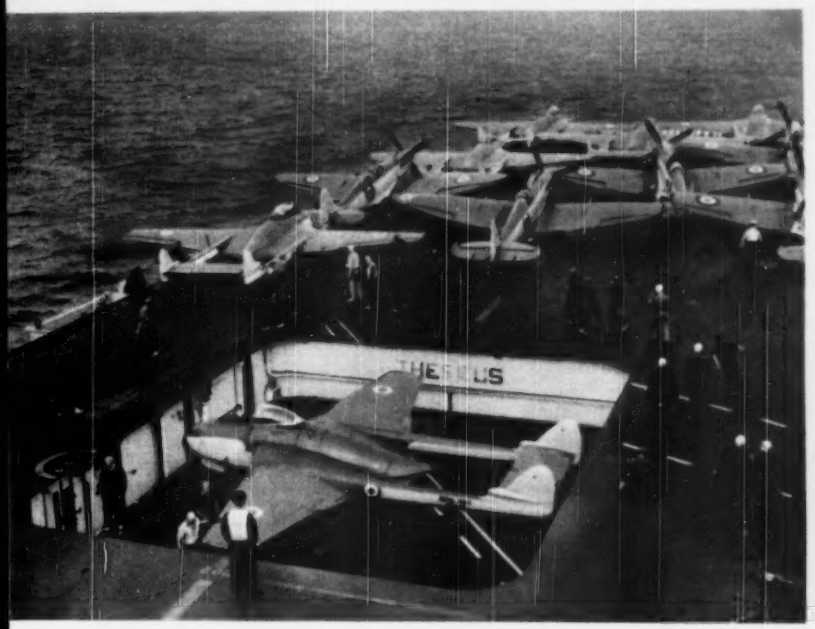
The "flare path" available consisted of a series of small deck lights along both sides, and two stubs of transverse lighting across their flanks about half-way along, and shining down on to the deck, making two smallish pools of light to each side. From my position near the batsman I could see no other lights, save the ordinary mast- and side-lights of the ship. There were, however, two attendant destroyers, one ahead and one astern, both wearing their usual lights.

To return to Clark's Vampire—which we left some 15 feet over the round-down—it arrived in a nose-up attitude with a fair amount of engine and, presumably, flap. The batsman waved the "cut," and Clark instantly shut the throttle, and sank the last few feet, still nose-up, with the long hook groping down for the arrester wires. The hook actually took up on No. 4 or 5 wire and the Vampire was appearently clawed down in a normal way, to arrive flatly on the deck with a clang, and to stay there, engine running, on the middle of the deck, the "V" of the pulled-out wire running out in a broad wake behind it.

After a buzz-over to have a look at the scene, Perrett then exactly repeated this landing procedure as soon as the deck had been cleared by the quick re-catapulting of Clark. A little routine of catapulting and landing then followed, until Clark had done two, and Perrett three, complete and uneventful cycles, after which the Sea Vampires were put down the lift, and the party was over.

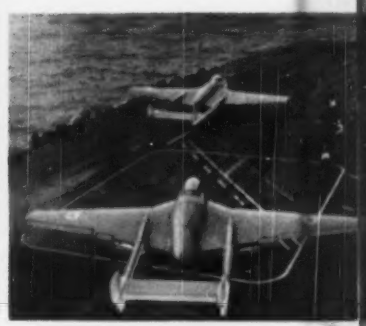
Both pilots said afterwards that they had little trouble with the approach and touch-down, although they paid even closer attention to the "batsman" than usual. Most pilots (even if, like me, they have never even been in a carrier before) will appreciate what Clark meant when he said that, after cutting the throttle, there followed an empty moment when all there was to do was to sit tight and wait on events. Even landplane drivers have had that moment.

The night catapulting seemed to be the trickiest part of the operation, especially as catapulting apparently leaves all the instruments lagging from shock for that vital second or two after becoming airborne, when the sea is very near and the air speed not very high.



(Left) Sea Vampires, with their non-folding wings of 38-ft. span, must be brought up on the lift in an athwartships position.

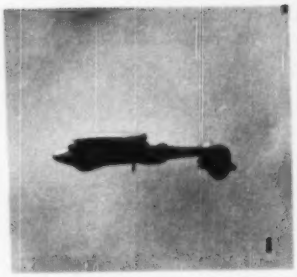
(Below) The diagonal white lines on the deck lead to a soaped beam. This is encountered by the starboard wheel of the aircraft, which is then skidded easily into the launching position on the catapult.



A NOTE ON SEA VAMPIRES

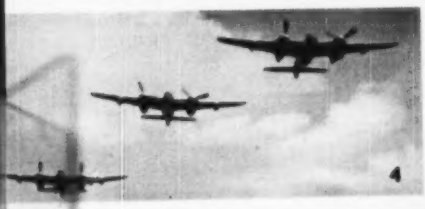
Some additional facts on the Sea Vampire and its operation may be of interest as an addendum to Mr. Gardner's article. The Sea Vampire 20 (Goblin 2) is a "navalized" version of the R.A.F.'s Vampire 5 fighter-bomber. Modifications include strengthening of the wings and the incorporation of an arrester hook just above the tailpipe orifice. Flaps and dive-brakes of the Naval version are of increased area, and a small metal angle-piece is fitted on each side of the fuselage, below the cockpit, to prevent the vertical members of the crash-barrier from fouling the air-intake shoulders. When Sea Vampires are landing-on, incidentally, one of the normal steel-cable barriers is replaced by two stout nylon ropes joined by vertical webbing straps. The normal barrier, which halt a truant Firefly or Sea Fury with only minor injury to the aircraft, would probably cut right through the cockpit of the airscrew-less Vampire and cause other severe damage.

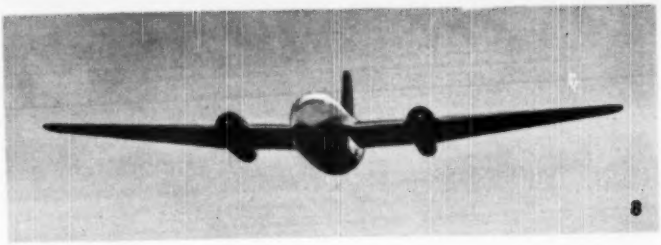
The Navy has to cope with a number of difficulties in operating Sea Vampires (the only deck-landing jets in R.N. Squadron service)—notably those caused by the jet efflux on the flight deck and the non-folding wings. As several Naval pilots have shown, however, there are no insurmountable problems from a flying point of view. The higher approach speed is to some extent offset by the much better cockpit visibility.

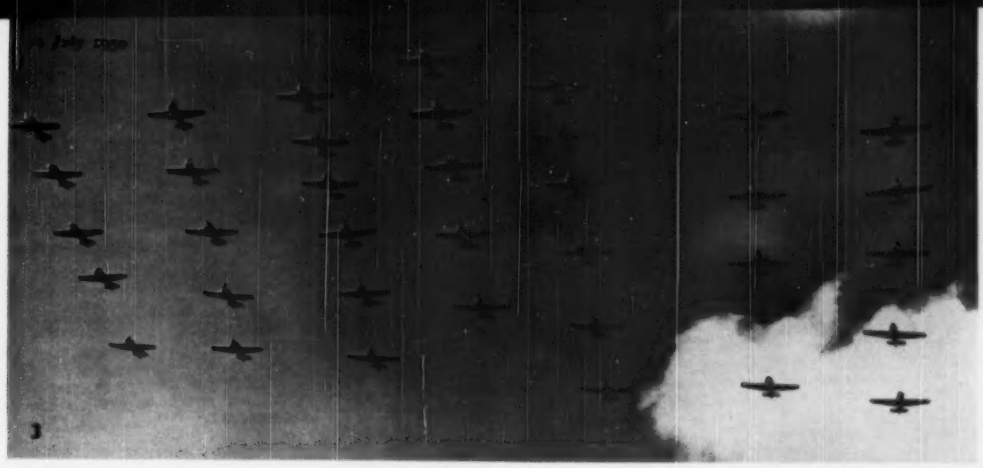


R.A.F. DISPLAY

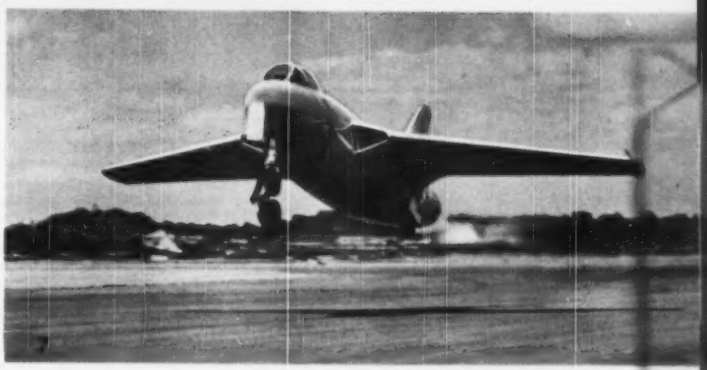
A PICTORIAL POSTSCRIPT

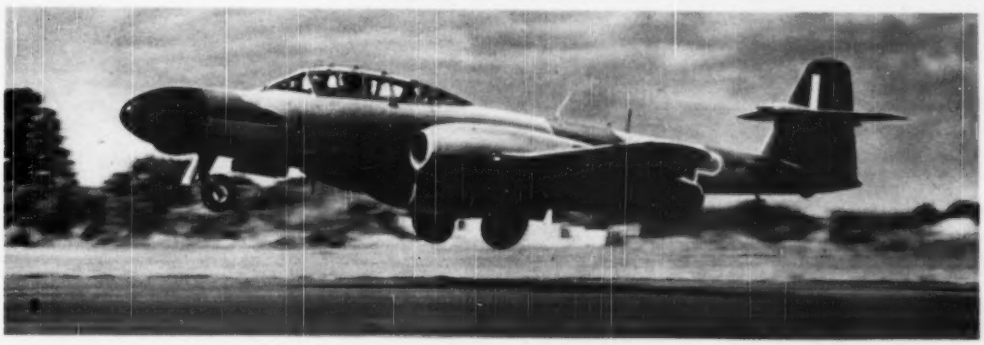






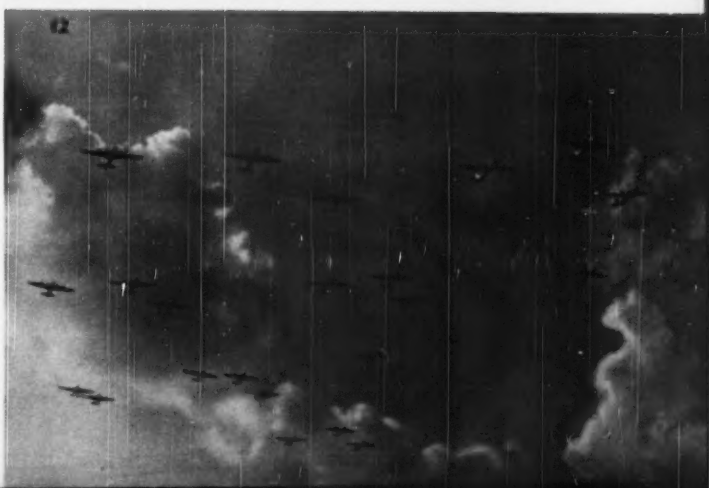
(1) Inverted fly-past during F/L. R. Emett's individual aerobatic performance on the Gloster Meteor 4. (2) With streams of red, white and blue smoke trailing from their Vampire 5s, the 54 Squadron aerobatic team fly overhead in tight formation. (3) Pattern-flying by the C.F.S. : 37 Harvards in seven flights, line-astern. (4) Mosquitoes are seen during their run-in for the attack on "Amiens prison"—the Display's most spectacular event. (5) Simulating Group Captain Pickard's aircraft, one of the Mosquitoes makes a second run to assess damage inflicted on the smouldering target. (6) In the Royal enclosure : (left to right) Air Chief Marshal Sir Ralph Cochrane, Princess Margaret, Mr. Aidan Crawley ; between Their Majesties, Mr. Arthur Henderson ; Marshal of the R.A.F. Sir John Slessor, H.R.H. the Duchess of Kent and H.R.H. Prince Michael. (7) A most striking study of the Hawker P.1081, first of the new aircraft to take off. Trevor Wade, Hawker's chief test pilot, is at the controls.

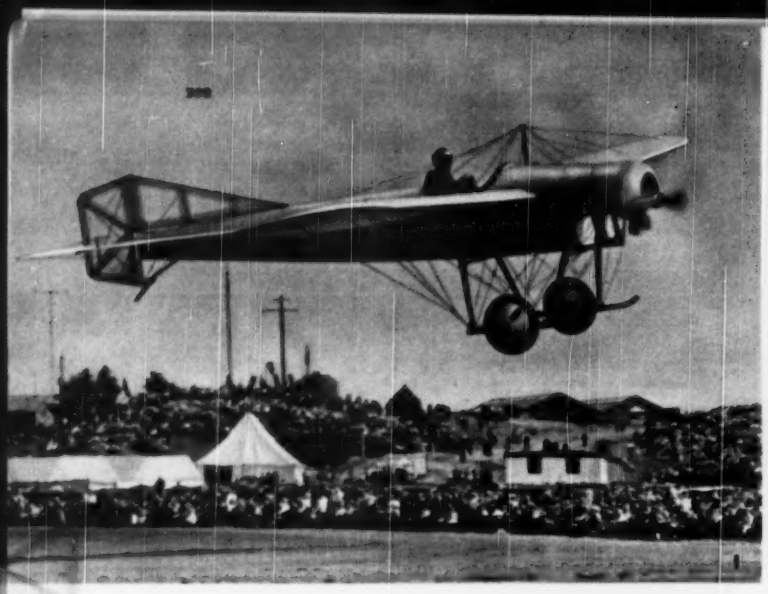


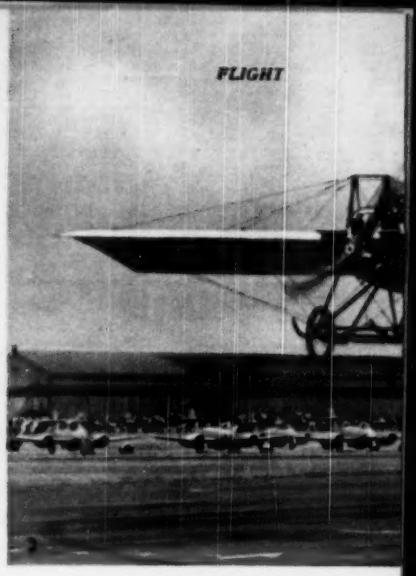


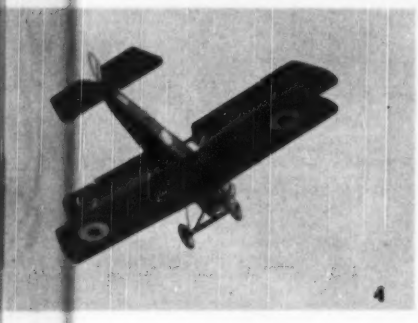
(8) W/C. Roland Beamont brings the Canberra prototype across the airfield at high speed and low altitude. (9) Another of the new types on show was the Gloster/Armstrong-Whitworth Meteor N.F.11, piloted by S/L. J. Lancaster. With its new radar nose, the Meteor II has a sinister and purposeful appearance. (10) As a post-script to the Amiens-prison event, modern methods of air-support were illustrated immediately after the Mosquitoes' attack. A Hastings is shown dropping parachute-borne supplies to the "escapees." (11) High ground surrounding the airfield gave most of the spectators a good view of the flying ; from the spot illustrated much of the comprehensive static park could be seen. The Avro Shackleton is prominent among the parked aircraft shown. (12) The largest aircraft in the fly-past were B-29 Superfortresses of the United States Air Force, 26 of which are illustrated.

All the illustrations on these and the two following pages, with the exception of No. 6 opposite, are from "Flight" photographs.

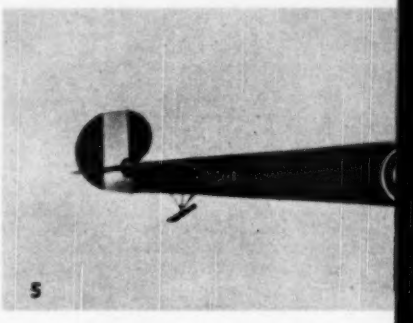




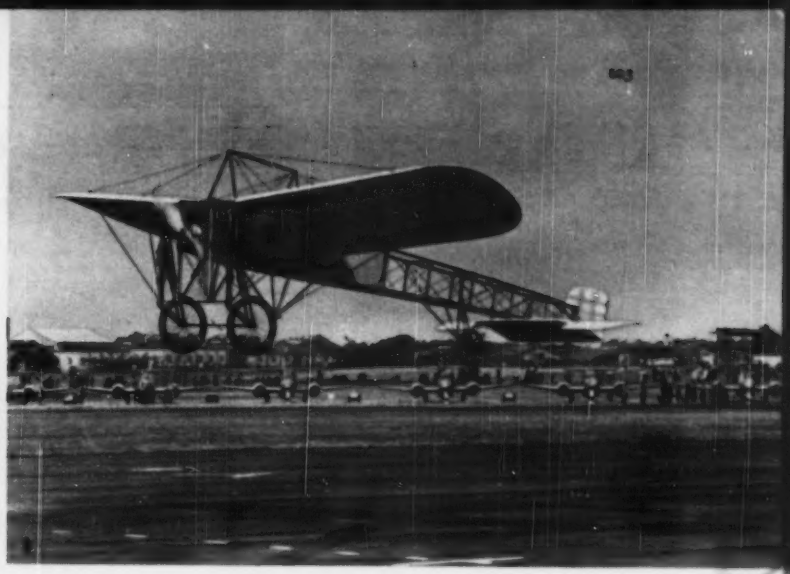


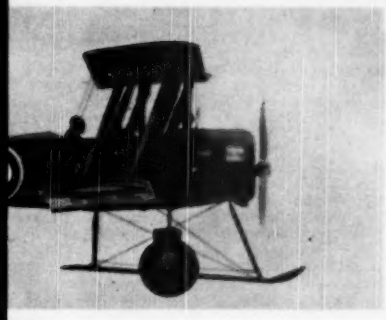


(1) Perhaps the most virile of the veteran monoplanes to fly at Farnborough was this 1912 Blackburn. S/L. Banner of the R.A.E. was at the wheel. (2) The 1910 Deperdussin, was in the capable hands of W/C. Calnan, Chief pilot of the R.A.E. (3) The 1909 Gordon Bennett Cup Blériot, which completes this venerable trio, piloted by Jeffrey Quill, is seen at approximately its maximum altitude. (4) G/C. Wheeler, who is in charge of experimental flying at Farnborough, shows off his own Sopwith Pup—a smooth and lively little machine. (5) Photographed during the dress rehearsal, G/C. Snaith makes a flight in the Avro 504K—his first experience of the old trainer since 1926. (6) *Storm*, a high-ranking canine member of the R.A.F Police. (7) Police Sergeant with walkie-talkie radio set for crowd-control.



R.A.F. DISPLAY...





(8) The four Meteor 4s of No. 263 Squadron's magnificent aerobatic team, which performed dramatically. (9) A Transport Command Hastings in the static park. In the background is a Boeing Washington B.1 (otherwise Superfort) of R.A.F. Bomber Command. (10) Another veteran: Sopwith Triplane in the static park. (11) Ex-enemies of the First World War—the S.E.5A (nearest camera), L.V.G. and and Fokker D.VII. (12) Heavily screened, this strangely shaped "secret device" excited the curiosity of many visitors. On enquiry, it was found to be nothing more than an asphalt-laying machine! At the foot of the page is a panoramic view of Farnborough on Saturday, July 8th, when over 100,000 people watched the "second house."

POWER FOR THE FUTURE

Relative Merits of Piston Engines, Turboprops and Turbojets Reviewed at World Power Conference

ONE of the more important symposia in the international calendar came to a conclusion last week in London. This, the fourth in the series of world conferences on power—the first (1924) was also held in London, the second (1930) was in Berlin, and the third (1936) was in Washington—was of considerable importance, not only by virtue of the common meeting-ground it afforded to technicians of many nationalities, but also because of the large number of notable contributions to the programme of learned papers presented.

We publish hereunder a digest of the paper, *Power Plant Requirements for Future Aircraft*, by Messrs. Owner and Hooker,* given in the Great Hall of the Institute of Civil Engineers on July 14th.

In the introduction to their paper, the authors stated that the classic simplification made by Sir Frank Whittle in using the same air in the thermodynamic cycle and the propulsive mechanism had led to no small confusion of thought in the assessment of the effects which changes in design parameters had on efficiency. A notable example of this could be found in the prevalent impression that raising the combustion temperature improved the efficiency of turbojets, whereas, of course, although the thermal efficiency of the cycle was improved by an increase in temperature, the propulsive efficiency was reduced by the higher jet velocity, and the combination gave a net reduction in overall efficiency. Specific power output was, of course, another thing entirely.

For the purpose of subsequent discussion, definitions of efficiency were given: *Cycle thermal efficiency* was the percentage of the fuel power which was made available for conversion to net propulsive power by the main thermal cycle. *Propulsive efficiency* was the percentage of the gas horsepower produced by the thermodynamic cycle, which was converted into net propulsive thrust power acting on the aircraft. *Overall efficiency* was the percentage of fuel power which appeared as net propulsive power. (It could be noted that, by definition, the overall thermal efficiency was the product of the propulsive and cycle thermal efficiencies as defined.)

The power plant could be regarded as being divided into a main thermal cycle for the production of power in the form of heated and compressed air, and into a propulsive mechanism for converting this power into thrust acting upon the aircraft. Given the component efficiencies of the compressor, the combustion system and the turbine for driving the compressor, the only remaining parameters upon which the thermal efficiency of the cycle depended were (i) the compression ratio and (ii) the peak cycle temperature.

As a result of the necessity to keep the bulk and weight of units to a minimum, the efficiency of compressors of practical design fell with increasing compression ratio at a rate greater than would be anticipated from a constant stage polytropic efficiency. The assumed fall in compressor efficiency shown in Fig. 1 represented efficiency values that could be obtained by employing the best modern technique of axial compressor design. The ability to start the engine easily, to accelerate it and to operate at part load without surging (all essential requirements for aircraft power plants) necessitated compounding axial compressors for compression ratios appreciably in excess of 6:1.

The variation of cycle thermal efficiency with compression ratio, forward speed and altitude was shown in Fig. 1, and it was significant that, under all conditions, the optimum thermal efficiency was obtained at compression ratios between 9 and 10:1. In view of the aerodynamic difficulties in high compression-ratio compressors, it was naturally advisable to adopt the lowest permissible compression ratio and, consequently, the authors had taken a compression ratio of 8.5:1 for their calculations as representing a good practical compromise.

The main reason for the increase in thermal efficiency with forward speed and altitude evident in Fig. 1 was the increase in compression ratio due to the ram compression in the air intake, which had been computed at 90 per cent. isentropic efficiency. The influence of altitude was secondary, because it only reduced the temperature of the air entering the intake. For example, at 1,000 m.p.h. at 40,000ft. the fall in intake temperature due to altitude would be 72 deg C, whilst the rise in intake temperature due to forward speed would be 100 deg C. Consequently, the net air-intake temperature was increased by 28 deg C over the static sea level value; despite this, however, the thermal efficiency was increased from 32 to 48 per cent. The design of the air intake was therefore clearly a matter of vital importance.

The remaining parameter affecting the main cycle thermal efficiency was the peak cycle temperature, and its effect was shown in Fig. 2, the curve having been computed for a designed compression ration of 8.5:1. It was not as yet possible to exceed a peak cycle temperature of more than 1,150 deg. K for protracted periods, owing to turbine-blade limitations. It was, however, clear from the diagram that the gain in thermal efficiency would be progressive and, further, the increase in specific output for any given power plant would increase enormously the peak cycle temperature—a point of

* *F. M. Owner, C.B.E., M.Sc., F.R.Ae.S., M.S.A.E., and S. G. Hooker, O.B.E., D.Phil., B.Sc., F.R.Ae.S., are respectively chief engineer and assistant chief engineer of the Engine Division, the Bristol Aeroplane Co., Ltd.*

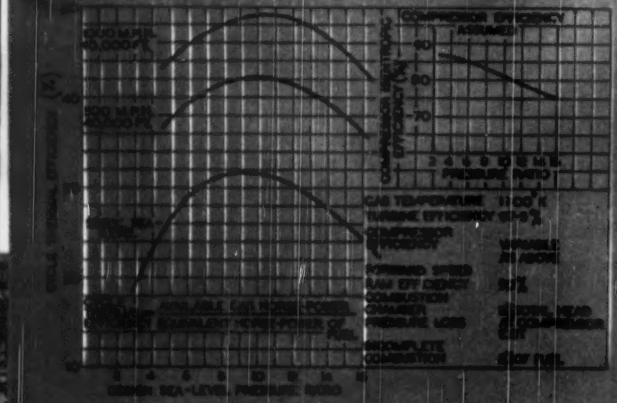


Fig. 1 (left). Curves of cycle thermal efficiency for gas turbines.

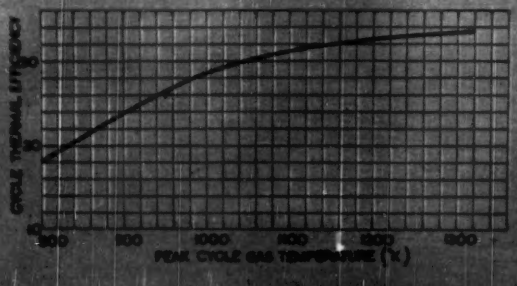


Fig. 2 (above). Cycle thermal efficiency at various peak cycle temperatures.

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Designed for training in all parts of the world.

The Balliol T.2 has been selected as the new standard advanced trainer for the Royal Air Force following competitive Service trials extending over twelve months. In the course of these trials, the Balliol has been thoroughly tested under tropical conditions and has proved itself as suitable for operation in the tropics as in more temperate climates.

With its service ceiling of 32,500 feet, the Balliol T.2 maintains a rate of climb of over 2,000 feet per minute to a height of 11,500 feet above sea level, and can thus be operated without difficulty from high altitude aerodromes. At 8,000 feet, its take-off distance to clear a 50-ft. screen does not exceed 640 yards.

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R·F·D LIFE-SAVING JACKET TYPE 50

The latest type of self-righting, pneumatic rubber-proofed cotton life-jacket, designed for use on aircraft and ships.

DETAILS

Jacket complete with securing tapes and mouth inflation	11·62 ozs.
CO_2 Inflation Unit (R·F·D Type) ...	6·73 ozs.
Valise, 9" × 3½" × 3½"	0·75 ozs.
Life Jacket: total weight	19·10 ozs.
Plastic Whistle and whistle pocket	0·50 ozs.
Waterproof Torch and torch pocket	3·00 ozs.
All-up weight	22·60 ozs.

FEATURES

Buoyancy, 32 lb.
Instant inflation by CO_2 Unit.
Auxiliary inflation by self-sealing mouth valve.
Self-righting, face-to-back position 2½ seconds.
Simple and quick attachment to body.
Strong 2-ply fabric: yellow.
Air Registration Board Approval No. E.1296.

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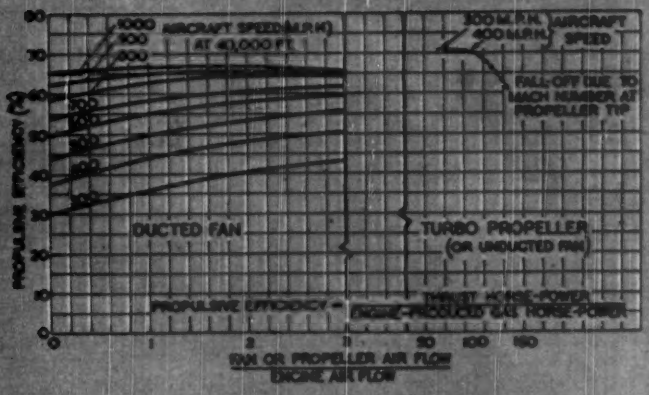


Fig. 3. Curves of propulsive efficiency of ducted-fan power units and turboprop units.

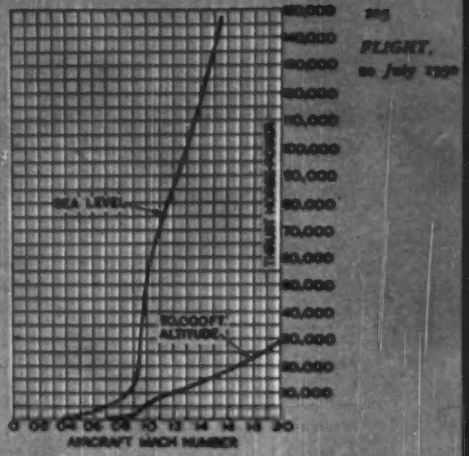


Fig. 4. Thrust horsepower required for supersonic aircraft.

great significance in relation to the supersonic aircraft.

The propulsive mechanism by means of which the gas horse-power generated by the main cycle was converted into useful thrust upon the aircraft could logically be divided into three main arrangements: (i) the turboprop, (ii) the ducted fan, and (iii) the turbojet. It was necessary to distinguish between the propulsive efficiency to which reference would thereafter be made, and the normal Froude efficiency of a propulsive mechanism. Whereas the Froude analysis of propulsive systems was concerned merely with the amount of energy which was wasted in the atmosphere in the form of kinetic energy of the propelling slipstream, the propulsive efficiency shown in Fig. 3 was the product of the Froude efficiency and the efficiency of the mechanism by which the power was transferred into the actuating disc of the airscrew.

It could also be seen from Fig. 3 that a propulsive efficiency of 70 per cent could be expected from the turboprop up to speeds of 400 m.p.h. and thereafter, at higher speeds, this efficiency would fall off due to compressibility losses at the airscrew tips. Thus, up to 400-450 m.p.h., the turboprop was by far the most efficient means of propelling an aircraft; thereafter, the weight and complication of the turboprop was an adverse feature, as was also the turbulent slipstream. These effects modified the preceding conclusions, based purely on efficiency, particularly at speeds above 400 m.p.h., and in an endeavour to overcome the objections to the turboprop, the power plant arrangement known as the ducted fan warranted attention. Again, in order to conform with the calculations of the main cycle thermal efficiency shown in the preceding curves, a main thermal cycle of 8.5:1 compression ratio operating with a peak cycle temperature of 1,100 deg K had been chosen. Additionally, a height of 40,000ft had been assumed in calculating the propulsive efficiency of the ducted fan for various forward speeds. The results were shown in Fig. 3. At forward speeds of between 500 and 600 m.p.h., which would be the cruising speed range for future long-range high-altitude jet aircraft, the ducted-fan power unit might yield dividends. These speeds were greater than those at which it would be profitable to use an airscrew, but a ducted fan having a mass augmentation ratio of 1 would give a 10 per cent improvement in propulsive efficiency, and this would be further increased to 16 per cent improvement in efficiency if the mass augmentation were raised to twice that of the engine.

For considering the power plant for the supersonic aircraft, the authors had taken as an example a typical modern aircraft requiring a thrust of 5,000 lb to give a sea-level speed of 0.85 Mach number, and had computed the actual thrust horse-powers required for supersonic speeds. These were shown in Fig. 4 for the two cases of flight at sea level and flight at 50,000ft, and illustrated that the thrust horse-power required at any given Mach number fell in proportion to the altitude pressure. An important point was that, whereas the speed of sound presented a formidable barrier at sea level, above 30,000ft the performance of the aircraft responded much better to increases in thrust, and supersonic speeds were much easier to obtain.

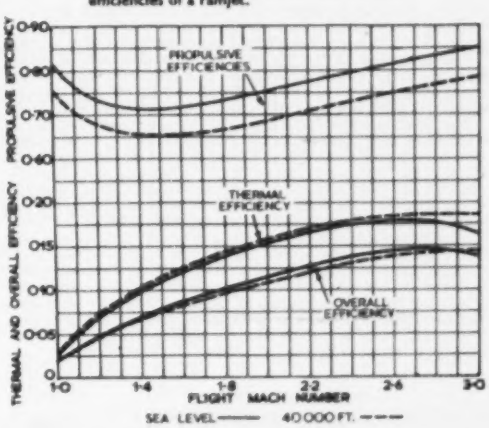
The authors next gave some interesting information on the ramjet, the basis of operation of which was that ram pressure was developed in the air-intake system, the compression taking place in two parts, (a) by normal shock compression when the speed was supersonic, (b) by sub-sonic diffusion after the bow shock wave in the air intake at 70 per cent efficiency; fuel was then burnt in the compressed air at the chemically correct mixture strength—which sufficed to give a peak temperature of about 2,000 deg K.

A loss of total head pressure must occur in a combustion zone, and the higher the entry Mach number into this zone, the higher the loss in pressure would be. On the other hand, the higher the air velocity into the combustion zone, the smaller the diameter of the ramjet, which was an important feature for any supersonic power unit.

After the combustion zone, the compressed and heated gases expanded to atmosphere and a net thrust on the unit was thus produced. If a final nozzle was fitted, this would be choked under flight conditions, but the optimum performance was evidently obtained when no final nozzle existed and the complete cross-sectional outlet area was choked.

So far as the propulsive efficiency of a ramjet was concerned, only the Froude efficiency of the jet had to be considered, and curves of propulsive efficiency, thermal efficiency and overall efficiency were shown in Fig. 5 as a function of flight Mach number. Two curves shown as full and broken lines were

Fig. 5. Thermal propulsive and overall efficiencies of a ramjet.



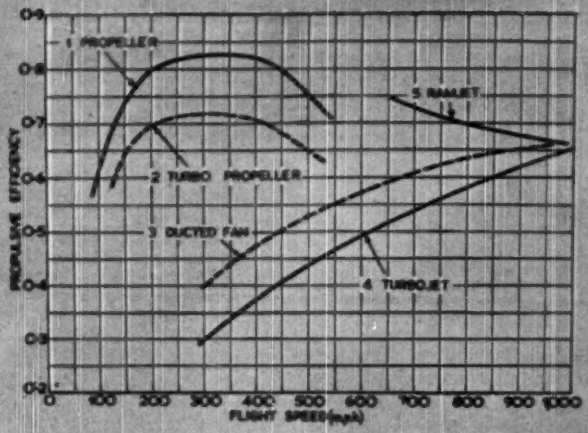
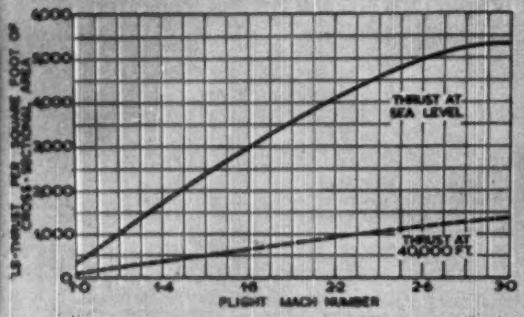
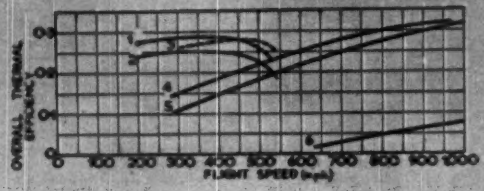


Fig. 6 (below). Ramjet thrust curves at sea level and 40,000ft.

Fig. 7 (right). Comparison of propulsive efficiencies at 40,000ft.

Fig. 8 (below, right). Overall thermal efficiency of power plants at 40,000ft :—(1) Compound piston engine and airscrew. (2) Piston engine and airscrew. (3) Turboprop, 8.5 : 1 c.r. (4) Ducted fan, 8.5 : 1 c.r. (5) Turbojet, 8.5 : 1 c.r. (6) Ramjet, 2,000 deg K. peak temp.





given, representing conditions at sea level and at 40,000ft. In Fig. 6 was shown the output which could be expected from a ramjet with the efficiencies assumed in Fig. 5. For convenience, the output was computed in terms of thrust per square foot of maximum cross-sectional area, and at a Mach number of 2 a thrust of 3,300 lb/sq ft of cross-sectional area would be generated at sea level, this figure falling to 950 lb/sq ft at an altitude of 40,000ft.

In the final section of their paper the authors made some generalized comparisons between the various power plants which had been considered. Despite the obvious difficulties, it had been thought worth while to compare the propulsive efficiencies and overall thermal efficiencies at a fixed altitude of 40,000ft, and over a range of flight speeds up to 1,000 m.p.h. As it would be less than just to omit from these comparisons the trusty and well-tried piston engine which, for nearly half a century, had held undisputed sway in aviation, it had been assumed that the basic piston engine had a thermal efficiency of 30 per cent at 40,000ft, and that, by compounding it with a turbine for a better utilization of its exhaust energy, a thermal efficiency of 35 per cent could be obtained.

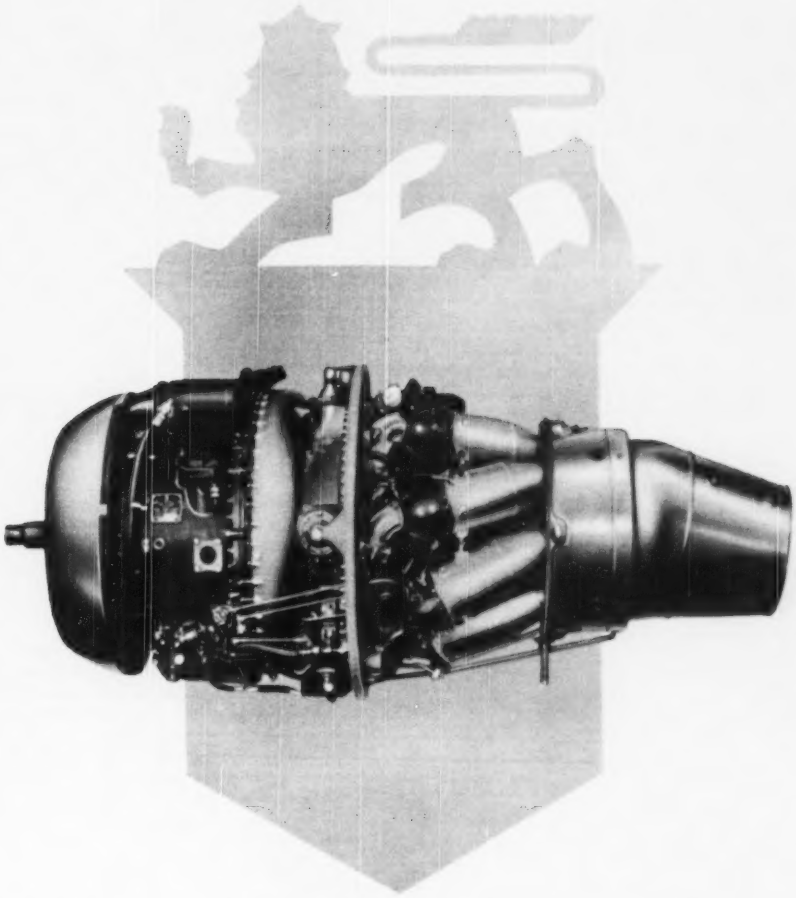
The discrepancy between these thermal efficiencies and those which had been quoted in the earlier sections of the paper for the main-cycle thermal efficiency of the turbine arose from the fact that the power developed by a piston engine was in the form of brake horse-power which could be applied directly to an airscrew. In contradistinction, the power supplied by the main thermal cycle of the turbine unit was in the form of heated and compressed air which, before it could be applied to the airscrew or ducted fan, as the case might be, had first to be expanded through a turbine of 85 to 87 per cent efficiency in order to generate brake horse-power. In the preceding sections of the paper this loss in the case of the turbine unit had been debited to the propulsive mechanism and was the reason why, in Fig. 3, the propulsive efficiency of the turboprop was shown as being no more than 70 per cent.

Propulsive efficiencies for the various types of power plants were shown in Fig. 7, and from this it was evident that the airscrew stood out as the most efficient means yet devised for propelling an aircraft. For the reason already given, the turboprop was some 10 per cent inferior as a propelling mechanism, and it was clear from the fall-off in efficiency at 500 m.p.h. that it would be inadvisable to attempt to utilize either beyond this speed. The superiority of the ducted fan over the turbojet showed up well over the lower part of the speed range considered, and only the complexity of the mechanical and installational problems held back the adoption of ducted-fan power units for high subsonic speeds. The one surprising feature was the high propulsive efficiency of the simple ramjet, but this advantage was completely annulled by the poor thermodynamic efficiency in the speed range considered.

A final comparison of the overall thermal efficiencies of all the power plants considered could be summarized in conjunction with Fig. 8. It was evident that the turboprop was a strong competitor with the piston engine at speeds of 300 to 500 m.p.h., and at high altitudes. The ducted fan had an appreciable advantage in efficiency over the turbojet at high subsonic speeds, but its adoption in preference to the turbojet in this speed range was dependent on a satisfactory solution of the problems of weight, bulk and installation. For supersonic applications, the considerations of bulk and weight were of paramount importance, and a compromise between these and efficiency would have to be made. For supersonic work the ducted fan had so little advantage over the turbojet in efficiency that this compromise would probably result in the selection of the turbojet.

In the case of the turbojet and the ramjet, however, although the former was the more efficient at the highest speeds under consideration, the same compromise would result, in certain cases, in the selection of the ramjet, which had the added advantage of simplicity of construction.

Progress



The Rolls-Royce "Dart" propeller-turbine engine which powers the Vickers "Viscount"

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Estate manager covers 1,000 miles in a day . . .

"The trouble with my job has always been an extended line of communications. It's pretty hard to get around on a rocky, wooded island with no railways, and precious few roads. Some of the estates and plantations, which my company is operating, are 400 miles 'up country' and the business of maintaining contact with the stations in the furthest districts under my control was costing me a lot of sleep and a lot of time. I suppose, too, this lack of liaison cost the company a lot of money.

"But that's all over now. Since the company brought a Sealand out here, and based it on the capital (where we do the office work), I've got around quite a bit. Yes, I should think I cover about a 1,000 miles on some days.

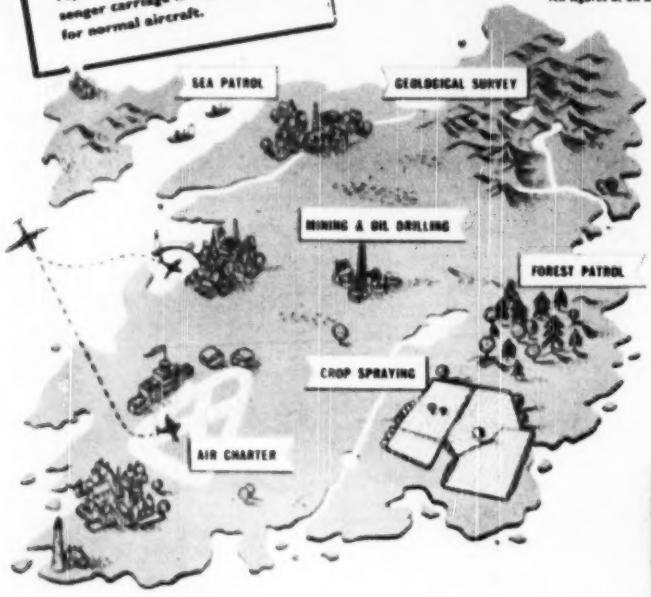
"It's a remarkable plane this Sealand. I've used it continually for all kinds of work. Its main value to me is that it takes my office right to the places where work is in progress on the crops. We can put it down even in the thickest jungle, as long as there's about 800 yards of lake or river to operate from. Sometimes, on the trip back, we fill her up with a tidy amount of freight — I've taken 1,000 lbs. of pineapples over the 500 miles from the East to the West Coast, without refuelling. And that's getting better than 6 air miles per gallon.

"Once a week I use the Sealand on forest fire patrol, and before harvest time we fit her up for crop spraying. It doesn't seem to matter what I want—an ambulance, a bus, or a truck—the Sealand is always ready to go anywhere."

● Shorts have designed the Sealand for all areas in which the conditions of this island are repeated, when freight and passenger carriage is impracticable for normal aircraft.

Engines: *2 Gipsy Queen 70, developing 145 B.H.P. each at take-off.*
Accommodation: *5/8 seater.*
Speeds: *196 m.p.h., all-out level. 155 m.p.h., max. weak cruising.*
Range: *600 statute miles at 127 m.p.h. with 1,000 lbs. freight. 315 statute miles at 127 m.p.h. with 6 passengers and baggage plus 80 lbs. of freight.*
Service Ceiling: *21,000 feet.*
Rate of Climb: *840 feet per minute at sea level.*
Take-off: *Water 835 yards. Land 450 yards.*

All figures at an all-up weight of 9,100 lbs.



★

IN any difficult region that is being developed — in Northern Canada, in South America, or in the East Indies, for example — the Short Sealand is the logical answer to the problem of transporting men or freight. It is as well suited to private owners and industrial concerns as it is to air-charter and feeder-line companies.

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Shorts THE FIRST MANUFACTURERS OF AIRCRAFT IN THE WORLD

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"*Flight*" photograph.

HANNIBAL THE YOUNGER : The flagship of B.O.A.C.'s Hermes fleet at London Airport after the christening party described on page 96.

CIVIL AVIATION NEWS

HERMES IV IN SERVICE

REFERENCE was made recently to the intention of B.O.A.C. to introduce their Hermes IVs on the African routes, and last week, on the occasion of the naming ceremony of the flagship of the fleet *Hannibal* (see page 96) confirmation and more details were given. It is intended that the first of these aircraft shall begin operation at the end of this month on the route between London and West Africa, *via* Tripoli, across the Sahara to Kano and onward to Lagos and Accra. Hermes will be replacing the Yorks at present in use. During August and September the Hermes will be introduced on the London to Cairo route—one service *via* Rome and one *via* Malta—and also on the East Africa route to Nairobi, with four flights a week in each direction, calling at Rome, Cairo and Khartoum. On this route they will replace Solent flying boats. To cater for important Uganda traffic two of the four services will call at Entebbe.

From mid-October, in co-operation with the South African Airways, the Hermes will operate the Springbok services three times weekly in each direction between London and Johannesburg *via* Tripoli, Kano, Leopoldville and Livingstone; from August 26th S.A.A. will be using Constellation 749As. Both routes will be flown without night stops.

There is also a proposal to operate Hermes to points in the Persian Gulf area (at present served by Argonauts) early next year. The main routes for the Argonauts, incidentally, are to South America and to Ceylon and the Far East.

A.O.A. SALE APPROVED?

ALTHOUGH no information had been received at the time of going to press it seems likely that there may be some element of truth in national press reports of President Truman's approval of the sale of American Overseas Airlines to Pan American World Airways. Reports indicate that such approval would be conditional on an extensive revision of the existing route-structure, which would probably allow T.W.A. to compete with Pan American to London and Frankfurt, and also permit P.A.W.A. to operate to Paris and Rome, which are now served by T.W.A. exclusively.

The proposed merger, which had previously been strongly contested by T.W.A. on the grounds that it would upset the balance of the "three-line system" established in 1945, has been the subject of lengthy C.A.B. hearings during recent months. The C.A.B. is understood to have voted to reject the merger, and if President Truman approves it he will do so by over-ruling the Board's decision—a course which he has already followed in several important cases in the past.

Another report from America mentions that the employees of A.O.A. have prevailed upon legal authorities to issue an injunction restraining the Government from implementing the sale until their plea has been heard in the Federal Court.

It is probably undesirable at this early stage to comment upon the far-reaching effects which the merger would have, but it is thought that T.W.A. in particular would certainly welcome the opportunity to serve London and Frankfurt and that the proposed revision of routes would, in fact, be acceptable to them. On the other hand there is little doubt that the combined strength of the two American carriers would provide formidable competition for B.O.A.C.'s Atlantic services.

INDIAN MARKET

THE question of finding a suitable replacement for the ageing Dakota—already a matter of some concern to operators in many parts of the world—is a problem which is now assuming major proportions in India, where the Civil Aviation Department has made it known that licence renewals for this type of aircraft will not be issued indefinitely. The DC-3 officially becomes obsolete at the end of 1951, and although preliminary plans are under way in India, Pakistan, Burma and Ceylon to obtain replacements, it appears that there is now a last-minute rush to find a suitable aircraft.

The problem is, as one article aptly puts it, "to find an aircraft comparable in price, performance and payload, which can also spread a gallon of fuel over 64 seconds of flying."

Vikings are already giving good service on Indian routes, and are known to be very popular with airlines. There are, of course, aircraft such as the Convair, which provide greater payload and considerably increased cruising speeds on short-stage lengths, but it seems hardly likely that Indian companies will give sanction for dollar payments unless British manufacturers are unable to meet early delivery dates for suitable equipment. One aircraft which has been discussed as a possible replacement to meet Indian requirements is the Vickers VC-3, the civil version of the Varsity and related to the Viking.

There appears to be in India a valuable potential market for British aircraft of the twin-engined variety, and it is to be hoped that manufacturers in this country will be able to take full advantage of the opportunity.

CIVIL AVIATION IN FRANCE

WHEN the French National Assembly recently voted a sum of fr.9,757,911,000 for the 1950 Civil Aviation Budget, the session was also made the occasion for a comprehensive debate on the progress and present requirements of commercial and private aviation. Presenting the annual report, M. Jean-Moreau, former Secretary of State for Air, said that most of the hoped-for air links between France and her overseas territories had now been established. It was still considered

CIVIL AVIATION NEWS . . .

essential, however, that an early liaison should be provided between France and the Antilles group (West Indies).

The debate brought many pertinent observations on such topics as the utilization of French equipment by Air France and the current demands for higher salary scales by certain categories of aeronautical personnel. The controversial question of incorporating the Secretariat of Civil Aviation in a centralized *Ministère de l'Air* evoked some forthright criticism. The president of the French Ministry of Transport considered that, if such a principle was adopted, the military standpoint would always be given priority over that of civil aviation. Another member declared that such a combination would be virtually "the death of French civil aviation." Finally it was agreed that the subject was too important to be included in the framework of this particular session, and it was intimated that there would be a special debate.

In voting a sum of fr 525,000,000 as a subsidy to Air France, tribute was paid to the exceptional progress which, in spite of great difficulties, the airline had made in the technical field. The recent accidents to French aircraft in Bahrein were said to have focused attention on the need for re-establishing a central "office of aerial safety," the continued absence of which public opinion generally deplored.

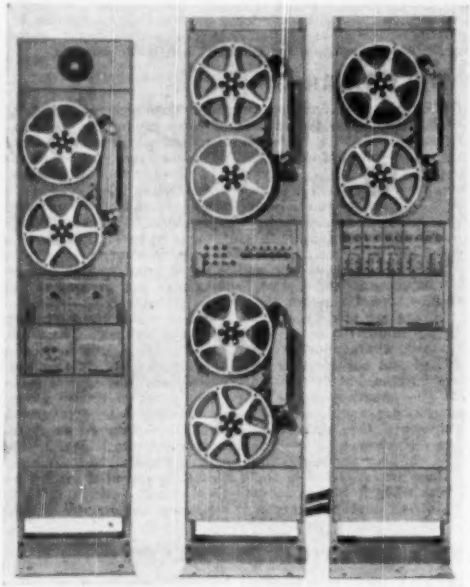
VISCOUNT'S TROPICAL TRIALS

THE prototype Vickers Viscount landed at Blackbushe airfield on July 10th after completing its tropical and high-altitude trials at Khartoum and Nairobi: it is the first aircraft powered with turboprops to undergo such tests. Since leaving the manufacturer's base at Wisley on June 5th, the Viscount has recorded some 67 flying hours in the course of an exhaustive programme which included climb trials and take-off tests at Eastleigh (Nairobi), more than 5,000ft above sea level.

Preliminary reports from Vickers suggest that the tests have been even more successful than was originally hoped. They have shown, among other things, that although the aircraft can be operated successfully either with or without the aid of water/methanol injection, distinct improvements in performance are obtainable if this method is used.

The return flight from Malta on July 10th was made at 22,000ft. In transit, the Viscount was flown by Capt. R. Rymer of B.E.A., who, it will be recalled, was the first pilot in the world to receive a commercial rating on turboprop-powered aircraft. The actual trials were carried out under the captaincy of Mr. G. R. Bryce of Vickers Armstrong. Capt. J. Summers was the tour manager. On arrival at Blackbushe the Viscount was still attended by the Valetta which throughout the tour had acted as servicing aircraft.

Meanwhile, progress with the production versions—the 700 series—is reported to be well under way, and it is estimated that the first "700" may emerge from the workshops for ground-running tests within the next week or two.



PLACED ON RECORD: The three units comprising the Thermionic magnetic-tape apparatus—described in *Flight* of June 29th—for recording aircraft-control conversations. On the right are the two recording racks and on the left is the play-back rack. Thermionic Products, Ltd., Morris House, Jermyn Street, London, S.W.1, are the makers.

TRANS-TASMAN SERVICES

THE New Zealand Minister of Civil Aviation, Mr. Stanley Goosman, announced on July 13th that Tasman Empire Airways have been granted permission to operate services between Australia and Christchurch, New Zealand. Chartered landplanes will be used, but their type is as yet unknown.

The decision thus eliminates the possibility of such a service being flown by a privately owned company. It was stated that, although the Government of New Zealand favoured private enterprise for this service, it found itself bound by the existing tripartite agreement which gives T.E.A. exclusive rights to trans-Tasman routes.

FIRST SCANDIA DELIVERY

ON the completion of its demonstration tour of the United States the prototype Saab Scandia was delivered to the Brazilian airline V.A.S.P.-Aerovias on June 12th. Four days later the second of the six Swedish aircraft on order arrived in Brazil, having flown across the South Atlantic. This machine, incidentally, was the first off the production line. To enable it to make the lengthy sea crossing, eight extra fuel tanks were fitted, and they have now been returned to the manufacturers for fitting into the third Scandia, which is due to be delivered some time this month. The remaining aircraft will reach Brazil before the end of November, and it is understood that those on order for S.A.S./A.B.A. will be available in time for next year's summer schedule.

BREVITIES

UNDER an agreement which has just been concluded in Washington Spanish airlines are now permitted to use the airports of Miami (Florida) and San Juan (Puerto Rico).

* * *

Fourteen Chelsea pensioners who had never been in an aircraft were given a complimentary flight over London on July 11th by the Lancashire Aircraft Corporation.

* * *

Since mid-June K.L.M. has increased the frequency of its all-freight services between Europe and America from one to two flights weekly. The company's freight network also includes services to Copenhagen, London, Switzerland, Istanbul and Teheran.

* * *

Swissair has announced the purchase of two DC-6Bs, which are to be used on the transatlantic services between New York and London *via* Shannon and Gander. Delivery is scheduled for May and June of next year. The DC-6B is five feet longer than the standard DC-6 and has a gross weight of 100,000 lb.

* * *

The U.S. Export-Import Bank has granted a credit of up to one million dollars to Ethiopian Airlines, Inc., to assist in the purchase of two Convairliners and spare parts for dollars. The aircraft will be used on the company's international services, and will permit the DC-3s now used on these routes to augment the services within Ethiopa.

* * *

On July 6th, at Cardiff City Magistrates' Court, a pilot was fined £5 and £15 15s costs for failing to take the necessary pre-flight action before entering the Metropolitan Control Zone under I.F.R. conditions, and for non-compliance with both visual and I.F.R. rules. This is the first case of its kind.

* * *

After the article "Conditioning for Profit" in our last week's issue had gone to press it was learned that, in fact, the whole of the Trans-Canada Air Lines fleet of twenty Canadair Fours had been converted to use Godfrey cabin blowers. The conversion was made on schedule, and the last (20th) aircraft was returned to normal service during the last week in June. Although the superchargers were supplied by the English parent company, the Canadian branch, Sir George Godfrey and Partners (Canada), Ltd., is now well established in Montreal.

Through the medium of the U.S. Air Transport Association several airlines have asked the C.A.B. for authority to cancel advance bookings or, when necessary, to take passengers off aircraft in order to meet demands for military and other Government traffic in an emergency. One effect of the proposed regulations would be to protect airlines against damage suits if they were forced to interrupt a passenger's trip.

* * *

A Skymaster belonging to the Near East Aircraft Corporation recently flew from Baghdad to Nicosia with no fewer than 152 Iraqui Jews on board. This is believed to be the largest Skymaster passenger load on record; the aircraft's normal capacity is for approximately 60 passengers. The flight was part of an operation which has been organized to transport 48,000 Jews from Baghdad to Israel in one year.

* * *

The second prototype of the S.E. 2010 Armagnac is due to emerge from the S.N.C.A.S.E. workshops to make its first flight at the end of August, while the third version of this 14,000 h.p. French transport is expected to be ready before the end of the year. It will be recalled that the first prototype crashed on a recent test flight. Air France, for whom 15 S.E. 2010s are on order, will receive the initial batch of eight production aircraft; it has been intimated that some of these may possibly be turboprop-powered.

It has now been announced that the C.A.B. has granted Israeli National Airlines landing rights at New York for one year. As mentioned in *Flight* of July 6th, this company will operate four DC-4s on services from Tel Aviv to New York *via* Greece, Italy, Switzerland, France, Britain, Ireland, Iceland Newfoundland and Quebec.

* * *

Indicative of the greatly increased traffic now being enjoyed by Central African Airways Corporation are the comparative statistics for the month of April in 1949-50. Revenue passenger-mileage rose by 23 per cent and revenue ton-mileage by 26 per cent. Equivalent annual utilization in April, 1950, showed an increase of 124 per cent over the figure for the corresponding month of last year.

* * *

Indian operators licensed by the Air Transport Licensing Board or possessing non-scheduled permits from the Director-General of Civil Aviation are now to receive financial assistance from the Indian Government. This takes the form of a subsidy at the rate of nine annas per gallon of aviation spirit used during the six-month period from April to September. The question of further assistance will be considered after the report of the Civil Aviation Enquiry Committee has been submitted some time in August.

THE INTERNATIONAL GLIDING CONTESTS

(Right) A general view of the gliding ground, with a Swedish sailplane about to be towed off. (Below) The Fi-1 flown by K. A. Rasmussen of Denmark.

F/L. P. G. Mallett's Gull IV and (bottom) members of the Swedish team, which was early in the lead.

AS we go to press, news of progress in the International Gliding Contests at Orebro, Sweden, is available up to July 9th. The contests ended on July 16th, and we hope to include the final results, together with a participant's impressions of the contests, in our next issue.

There were 29 competitors on the general assembly day, July 3rd. Countries represented were Denmark, Finland, France, Holland, Norway, South Africa, Sweden, Switzerland, U.S.A., Yugoslavia and Britain. Egypt and Poland withdrew before the Contests opened. All pilots were given qualifying dual in Kranichs beforehand. Most of the gliders were Weihes, and there were also, among others, Olympias, French Air 100s, Swiss Mowey 30s, and the Yugoslav Arao 2.

July 4th was a practice day, and P. A. Wills reached 3,660 metres, while Lome Welch made an out-and-return flight of 80 km. The following day—the first contest day (distance and altitude)—provided anti-cyclonic weather, with thin, flat cumulus at about 1,200 m. Legler (Switzerland) was first off at 10.30 hr, with Welch, Wills, Forbes and Mallett (the British team) taking off later. By the end of the day, Forbes had flown 195 km, Wills 176 km, Mallett 140 km, and Welch 118 km. The longest flight of the day was made by Alm (Sweden) with 284 km, which gained first place with a gain of height of 3,030 m. Second was Paul McCready (U.S.A.) with 246.5 km and 2,885 m. Wills came 12th (175.9 km, 197 m), Forbes 13th (194 km, 1,630 m), Mallet 16th (140 km, 2,370 m), Welch 27th (120.3 km, 1,400 m).

On the second contest day, the anti-cyclone had moved north, and there were two small fronts, with rain, in the south. The contest was for a goal flight, and Forbes reached his declared destination of Varberg (293 km), thus raising himself from 13th to 4th place in the contests. Mallet, Welch and Wills flew 248 km, 263 km and 293 km respectively, but did not reach their declared goal of Halmsted (323 km). Mallett was singularly unfortunate when his canopy blew off 200 km from Orebro, and Wills' aircraft received some damage later in the day. At the close of the second day, Forbes lay 4th (274 points to date), Wills 21st (213 points), Mallett 25th (204) and Welch 27th (188).

For the third competition day, a speed race to Lidköping (142 km) was arranged. Wills and Mallett were delayed by repairs to their aircraft and did not get away until the afternoon, when thermal activity had lessened. Neither reached Lidköping. Influenced by optimistic weather reports, Forbes and Welch also started late, but could not equal the performance of others who had ignored the forecasts by making an early start. The day's competition was won by Paul McCready (U.S.A.) at 85.66 km/hr, flying a Weihe bought in Sweden a few days before the Contests started. The lead was held by Sweden (421 points to date), with Forbes 12th (354 points), Welch 22nd (264 points), Wills 27th (220 points) and Mallett 28th (216 points).

July 8th was a rest day, followed by a race to Norrköping, which was won by McCready, thus bringing the U.S.A. into first place. Mallett came 11th in the day's contest, Welch 14th and Forbes 16th.

CORRESPONDENCE

The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

A Display Criticism

A SMALL though not unimportant criticism of the stage-management at Farnborough: The spectators in the boxes opposite the eastern end of the runway in use could see nothing of the "Helicopter-circus" which concentrated entirely on the expensive and exclusive centre section.

The aircraft might at least have done a circuit of the spectators, as at Gatwick last year. Many big as well as small children who had looked forward to this item were disappointed at being deprived of it.

In general the show was, as usual, superb, the flying stupendous.

Cheltenham. ROTATING WING.

Early Deck-landings

FOR reasons of my own, I have no feelings of affection for the R.N.A.S., or the same Service by any other name. My loyalties are with the R.F.C. and R.A.F.

I enjoyed, therefore, "Deck Landing Long Ago" by S/L. H. R. Bunn, M.B.E., A.R.Ae.S. (*Flight*, June 29th). In the interests of accuracy, however, I must point out that he is not strictly correct when, on referring to the Schneider Trophy teams, he asserts that the late Lt. G. L. Brinton, R.N., "was the only Naval pilot ever to be selected." F/L. S. M. Kinkead, D.S.O., D.S.C., started his career with the R.N.A.S. and was therefore a Naval pilot. He took part in the 1927 contest with the Gloster-Napier IV biplane and on one lap accomplished 289 m.p.h. He was killed, subsequently, while practising for or attacking the world's speed record.

Potters Bar, Middlesex. A. H. CURTIS.

Seating and Safety

HOW much longer are aircraft manufacturers and users to continue countenancing the one grave remaining weakness in passenger planes? I refer to the totally inadequate provision against longitudinal shock loads on passengers and chairs. Many of the chairs are so light and rest on such feeble legs that one would not feel too safe on them in a theatre. Yet even in slight accidents they may be called upon to withstand a heavy longitudinal shock load, whilst in a major crash the passengers collectively are capable of exerting endways a force equal to over 100 tons on the structure of the fuselage, a load, incidentally which the structure could actually accept without total collapse if seats were longitudinally integrated into it, and not pinned down by innumerable separate clips to a vulnerable floor. In the Tudor crash last March only one seat remained in position, carrying the only survivors. Who can say why so many passengers are lost in sea ditchings, or where they were in the cabin when it eventually foundered?

Passenger seats could be rendered so secure against longitudinal dislocation as to survive in part even the total destruction of the fuselage, by being anchored to the tail unit at floor level. And if they would accept backward-facing seats the degree of security would be almost one hundred per cent.

Reading, Berks. J. R. STURGE WHITING.

Boeing Pioneering

WITH reference to my letter published in your Correspondence page, June 29th issue, I would like to apologize for an unfortunate slip of the pen which resulted in a wrong year being quoted. The beginning of the second sentence of paragraph two should have read: "By the end of 1934 some 50 machines of this type [Boeing 247] were in service with three leading American companies. . . ."

Although the prototype Boeing 247 was completed and flown by the end of 1932, the first photographs of the aircraft itself were not released until February 7th, 1933, copies of which I have on my historical files.

Prestwick, Ayrshire. DENNIS M. POWELL.

We Move Mountains

A STUDY of a picture on page 75 of *Flight* for July 13th leads to the following rumination:—

As I sat in my Spit in the sultry sun
Listening to tales of yore—
How the mountain came to Mahomet
And Kai Tak to Singapore—
It occurred to me that your view was wrong
Or its caption a little strange,
For the flight from Hong Kong to Singapore
Is outside a mountain's range!

Stratford. D. R. STANLEY-ADAMS, Lt., R.N., retd.

A NEW HANNIBAL (*Continued from page 96*)

is incorporated in the Hercules engines, as is explained below, there will be an appreciable improvement.

In connection with Sir Frederick's reference to a payload increase, it is learned that certain tests have already been made at Khartoum with an all-up weight increase of 2,000 lb, and that a further 2,000 lb is within the aircraft's capabilities following the increase in take-off and climb power for which the Hercules engines have now been cleared. The present all-up (C. of A.) weight of the Hermes IV is 82,000 lb, and further tests are to be undertaken at weights of 84,000 and 86,000 lb. The Bristol Hercules 763 power units, contained in unusually shapely nacelles, now give 2,100 b.h.p. (at 16½ lb boost) for take-off—a marked improvement over their earlier figure of approximately 2,000 b.h.p. with 1 lb less boost.

Had time permitted, a new improved type of flap would no doubt have been incorporated in Hermes IVs of the B.O.A.C. fleet, and it certainly seems strange that a Handley Page aircraft should be under-flapped, as by modern standards the Mark IVs are. It is understood that there is a possibility of incorporating the new flaps at a later date, possibly to coincide with the authorization for a greater all-up weight. To increase the all-up weight with the present flaps would be quite possible, but would no doubt entail a rather high approach and landing speed. The Handley Page company make no comment on these proposals except to state that the Theseus turboprop-powered Hermes V will be flying next month with the latest mods. including the new flaps. B.O.A.C. state that the cost of the flap modification to permit the authorization of a greater all-up weight would pay for itself in a year.

The vee-rod modification, to which reference is made above, entails no change in components but only a rearrangement of position of the connecting-rod assembly. On the majority of Hercules engines, the master connecting rods for the two banks of cylinders are opposed—at 180 deg—in Nos. 4 and 11 cylinders. As the name implies, vee-rod engines have their master rods positioned at an acute angle of approximately 26 deg in adjacent cylinders Nos. 6 and 7. This does not eliminate vibration entirely, but has the same effect in operation by altering and narrowing the r.p.m. range at which it occurs. It would be very costly at this stage to remove all the power plants from the near-complete Hermes fleet; therefore, the vee-rod reassembly will not be carried out in all of them until their first major engine overhauls, which will probably occur at between 500 and 600 hours. Four aircraft and all B.O.A.C. spare power units will have vee-rods from the outset.

FORTHCOMING EVENTS

July	22.	Yorkshire Aeroplane Club: International S.B.A.C. and Air League Cup Races, and Yorkshire Club Trophy Race, Sherburn-in-Elmet, Leeds.
July 22-24.		R.Ae.C. Members' Nice Rally.
July	23.	St. Albans Model Aero Club: Annual Rally, Handley Page Airfield, Radlett.
July 22-30.		Derbyshire and Lancashire Gliding Club: National Gliding Contests.
July 22-31.		International Military Air Pentathlon, France.
July 27-Aug.	5.	Holy Year Rally, Italy.
July 28-31.		Orange Rally, France.
July	29.	Newcastle-upon-Tyne Aero Club: Norton Griffiths Trophy Race and Grosvenor Cup Race (both International), Woolsington.
July	29.	Royal Netherlands Aero Club: International "Squadrons" Competition, Ypenburg.
Aug.	5.	Liverpool Flying Club: "At Home."
Aug.	6.	Cowes Aero Club: Display.
Aug.	7.	Display, Eaton Bray Airfield, Beds.
Aug.	16.	R.A.F. Golfing Society: Match v. R.N. and R.M. G.S., West Hill.
Aug.	19.	Association of British Aero Clubs: Summer Convention.
Aug.	19.	Swansea and District Flying Club: Kemsley Trophy Race (International), Fairwood Common, Swansea.
Aug.	26.	Wiltshire Flying Club: Thruxton Races.

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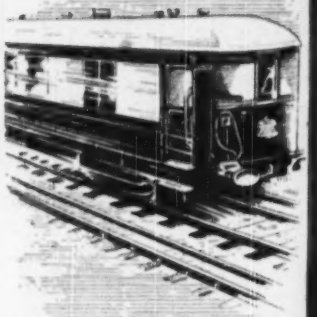

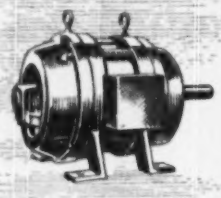

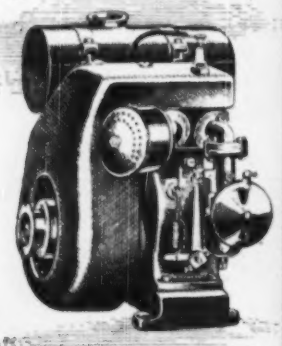

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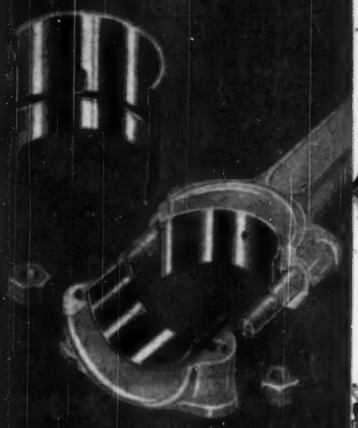

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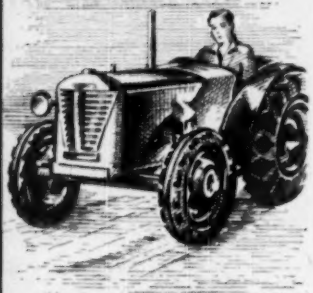

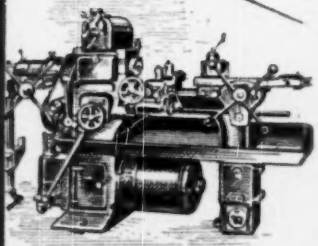

SERVICE AVIATION

OFFENSIVE AIR: In the words of the manufacturer, graphically illustrated by this new air-to-air view, the Blackburn Y.A.5 has "a long, capacious bomb trunk, capable of holding a large mixed load of attack weapons." Also shown is the retractable radome, here seen extended. The cranked wings of the Y.A.5 are of 44ft 2in span, slightly more than the fuselage length of 42ft 5in.

C.F.S. Together Again

THE Chief of Air Staff, Sir John Slessor, took the chair at the Central Flying School reunion, held in London on Friday last. Sir John went to C.F.S.—to gain his wings as a second lieutenant—35 years ago, and commanded it in 1918.

Of all reunions, that of C.F.S. invariably excels in its wealth of anecdote. On this occasion, for instance, two officers who were at the school in the early 'twenties were to be heard "remembering" how they went out each morning on Mono Avro 504s to race with the Fishguard express over an 80 m.p.h. stretch of line. According to the direction of the wind the daily race was either lost or won.

Then there was the account of the instructor with a sergeant in the rear seat. The weather was thick, and fuel low. The sergeant baled out. The instructor flew on, landed in a fog-bound field, walked to the nearest garage for petrol, took off again, and was back at C.F.S. in time to receive a telephone message from his passenger—to the effect that he had been hanging from a tree by his parachute cords for over an hour.

A.V-M. R. L. R. ("Batchy") Atcherley was not present, but someone was heard recalling the occasion on which he equipped himself with sandwiches, fruit and coffee and "flew the Atlantic"—in a Link trainer.

G/C. Stephenson, the present commandant, welcomed the assembly, making particular mention of Lt. Col. MacLean, who, in 1916, was the fourth commandant of the school. Type flying, he pointed out, was now entirely done on Meteors and the flying hours for the year amounted to 28,000.

Sir John Slessor gave a considered opinion that the quality of the flying seen at the R.A.F. Display was due entirely to the basic training given by C.F.S. He also referred to ex-C.F.S. members of high rank who still flew their own aircraft. This was an obvious compliment to Sir James Robb, who was a pupil in 1916, chief flying instructor in 1927, and commandant in 1934, and who still flies his own Meteor.

Royal Air Force and Naval Aviation News and Announcements

African Inspection

THE Air Member for Personnel, Air Chief Marshal Sir Leslie N. Hollinghurst, left England last Monday for a tour of R.A.F. establishments in the Middle East, Kenya and Rhodesia. He is expected to return to this country on August 6th.

Travelling with him, as assistant air quartermasters, are two London cadets: P. Gray, of the R.A.F. section of the Combined Cadet Force at Dulwich College, and C. Wilson-Apperson of No. 267 Squadron, A.T.C.

London's Auxiliary Radar Unit

FOLLOWING discussions with the Radar Association, the Air Ministry announces formation of No. 3700 (County of London) Radar Reporting Unit, which will be concerned with the role of manning, operating and servicing of the "Chain Home" stations which give early warning of raiders approaching the British coast. The Unit's H.Q. and social centre are at 77, Hallam Street, London, W.1.

The Commanding Officer of No. 3700 R.R.U. is G/C. E. Fennessy, O.B.E., a prominent member of the Radar Association and a director of the Decca Navigator Company. He has been associated with radar development for the last 12 years, and was awarded the O.B.E. in 1943 for his work on systems of navigation and blind-bombing.

Desert Rescue Exercise

WITH the intention of testing land/sea/air rescue forces and of providing an opportunity for R.A.F.-Army co-operation, No. 205 Group, Middle East Air Force, recently organized a large-scale rescue exercise in the Eastern Desert, some miles inland from Gulf of Suez. Aircraft from Kabrit co-operated with a mixed ground rescue party—formed from the R.E., R.A.F. and R.A.F. Regiment—in the search for a coloured bag dropped in the desert to simulate wreckage.

The ground party's vehicles, moving over difficult terrain, became separated on one occasion, and one of the lorries broke down, but the "crash" was successfully located. Some of the rescuers then took the part of casualties and were taken aboard a high-speed rescue launch from R.A.F. Fanara, on the shores of the Great Bitter Lake. Mosquitoes from Fayid provided top cover for the final phase.

U.A.S. Round-up

IN order to assist the three pre-war university air squadrons to maintain contact with former members, and to bring their registers up to date, former members of these squadrons who are still serving in the R.A.F. are asked to write to the commanding officers, giving, in addition to their names, ranks and decorations, their permanent and Service addresses, the dates between which they were at the university, the name of their college, and the dates of their squadron membership.

Similar information regarding former members who are not now serving in the R.A.F. is also requested. The addresses to which letters should be sent are: Cambridge University Air Squadron, 2, Chaucer Road, Cambridge; Oxford University Air Squadron, Manor Road, Ox-

SERVICE AVIATION . . .

ford; and University of London Air Squadron, 48, Princes Gardens, London, S.W.7.

New W.R.A.F. Barracks

MR. ADRIAN CRAWLEY, the Under-Secretary of State for Air, officially opened the first of a new type of barrack block for W.R.A.F. personnel at Flying Training Command H.Q., Shinfield Park, Reading, on July 14th. A two-storey, "Z"-form building, the new block has 78 single cubicles and additional accommodation for six W.R.A.F. sergeants. It is decorated throughout in pastel shades, and each single berth has its own built-in wardrobe with full-length mirror, wall-light and bedside lamp.

R.N. Flying Club Meeting

THE Royal Naval Flying Club held its "At Home" on Sunday, July 9th, at R.N.A.S. Gosport. Admiral Sir George Creasey, president of the Club, was present, together with Lady Creasey, and Admiral Sir Reginald Portal, Lady Portal and Rear Admiral Everett. Twenty-seven aircraft arrived and a number of competitions were held.

Colonel J. Elwes, in a Messenger from White Waltham, won the concours d'elegance and Mr. L. E. A. Chester-Lawrence (Tiger Moth) received first prize in the arrival competition. Three Seafires, representing Nos. 1831 and 1833 R.N.V.R. Air Squadrons (based at Stretton and Bramcote), gave a short demonstration.

R.A.F. Appointment

WITH the acting rank of Air Commodore, G/C. P. D. Cracroft, A.F.C., has been appointed Senior Air Liaison Officer of the United Kingdom Service Liaison Staff in South Africa. Until recently he commanded the joint Anti-Submarine School at Londonderry.

Born in 1907, A.Cdre. Cracroft was commissioned in the R.A.F. in 1927. Much of his early service was with the Fleet Air Arm and he has been associated with maritime aviation during the greater part of his career. Following a succession of wartime Coastal Command appointments he spent a period in the Bahamas as Commander of No. 111 O.T.U. At the end of the war he was posted to the Far East as S.A.S.O. at Air H.Q., South-East Asia.

PROUD MOMENT for Officer Cadet D. Fish as he receives the Sword of Honour from A.V.-M. B. V. Reynolds at the recent passing-out parade of K.4 Course at No. 2 O.C.T.U., Kirton-in-Lindsay. On the right is the Station Commander, W/C. P. A. Tipping.

Benevolent Fund Council

THE Royal Air Force Benevolent Fund announces that the following have joined the Council of the Fund: Dame Katherine Trefusis Forbes, Lady Slessor, Gen. Sir Mosley Mayne, Air-Marshal Sir Hugh Walmsley, and Air-Marshal T. A. Warne-Browne.

Military Air Pentathlon

TWO R.A.F. teams will represent Great Britain in the International Military Air Pentathlon at Arcachon, near Bordeaux, between July 22nd and 31st. The captains will be S/L. G. A. Podevin, of Fighter Command, who with F/L. L. S. Lumsdaine (Boscombe Down) will form the "A" team, and S/L. W. Allsopp, of "B" team, with F/L. E. A. Tippell (Hawarden). The reserve will be F/L. G. O. Russell (Halton), and S/L. J. W. Souter (Swinderby) will be medical officer.

Other countries also entering two teams are Belgium, the Netherlands, Switzerland and France. The Argentine, Egypt, Finland, Greece, Italy, Luxembourg, Norway, Sweden, Turkey and the United States of America were also invited. The teams must first enter the air rally, which entails flying from Paris to Arcachon over an indirect course with a number of pinpoints, to arrive at Arcachon at a specified time. The route will be notified to the competitors only an hour before take-off.

Having completed this test, teams are then eligible to enter for the Pentathlon proper, consisting of rapid pistol-firing, swimming (including a 3-metre dive, picking up three objects at the bottom of the swimming bath at distances of 40 metres, 30 metres and 5 metres, and swimming back 50 metres free style, the whole event being arranged on a time basis), basketball, fencing (five hits with the foil), and an escape course. This last event is a particularly arduous one, in which competitors, wearing 25lb packs, will first have to negotiate a difficult obstacle course before completing a cross-country course of about 12km, including a river between 200 and 300 metres wide which must be swum.

The R.A.F. team (also consisting of S/L. Podevin and F/L. Lumsdaine) won last year's competition, and in 1948 the R.A.F. came second. The teams for this year's competition will fly from Headon on July 22nd in the aircraft in which they will compete in the air rally, the "A" team in a D.H. Devon and the "B" team in an Avro Anson.

Battle of Britain Reunion

A BATTLE OF BRITAIN reunion dinner will be held at Fighter Command Headquarters on Friday, September 15th. Assembly will be at 7.30 p.m. for 8 p.m. and dress will be lounge suits.

All serving and released flying personnel who flew in fighter aircraft engaged in the Battle of Britain between July 10th, 1940, and October 31st, 1940, and who are eligible to wear the clasp of the 1939/45 Star, are invited to apply for tickets to the Senior Personnel Staff Officer, H.Q., Fighter Command, R.A.F., Bentley Priory, Stanmore, Middlesex, not later than August 1st. Envelopes should be marked "Battle of Britain Dinner." Accommodation will be limited but everything will be done to accommodate as many as possible.

FAIREY'S LATEST: Compressed air is employed to drive the starter-motor of the Fairey 17's Armstrong-Siddeley Double Mamba power-unit. Main dimensions of this new anti-submarine aircraft are: span, 54ft. 4in. (folded, 19ft. 6in); length 43ft.

No. 1 Temperature Measuring

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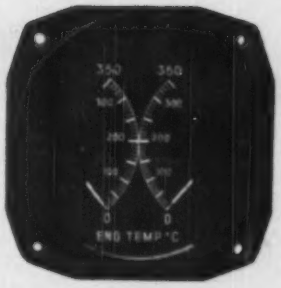

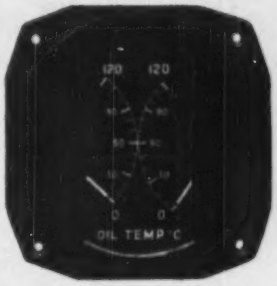

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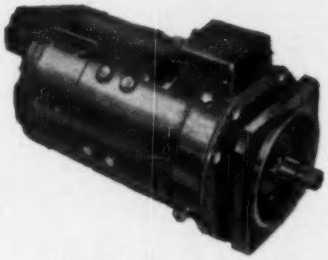

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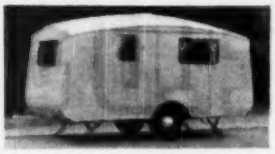

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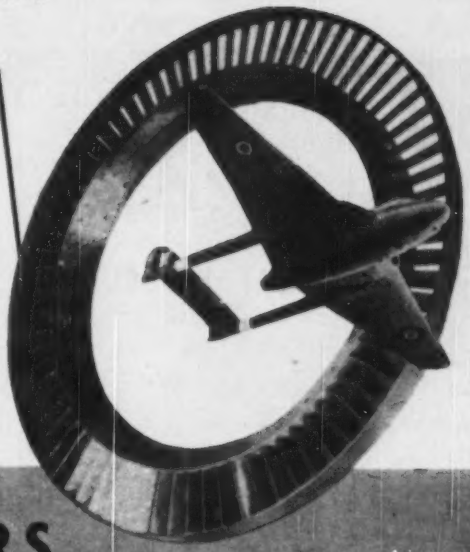

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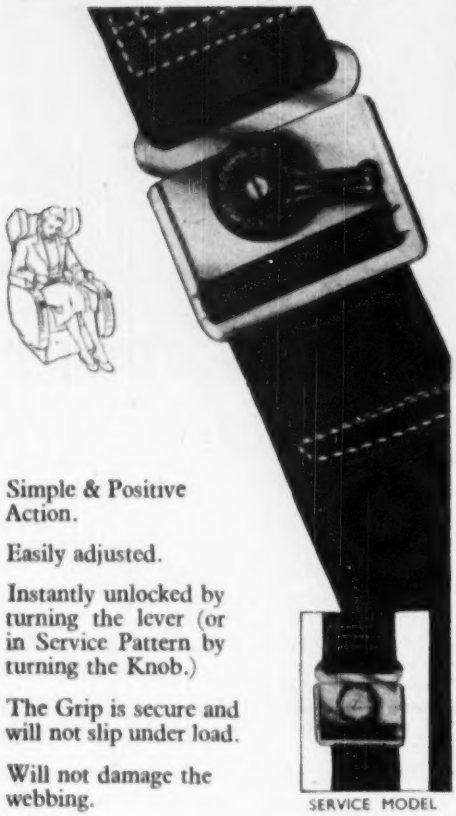

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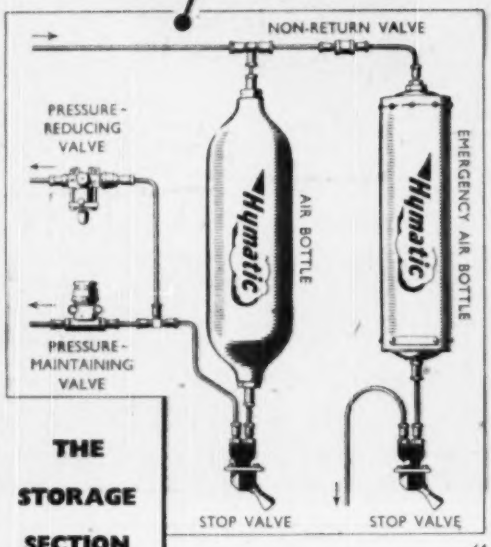

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IT is desired to secure the full commercial development in the United Kingdom of British Patents Nos. 562,309 and 566,160, which relate to "Parachutes," either by way of the grant of licences or otherwise on terms acceptable to the Patentee; interested parties desiring copies of the patent specifications and further particulars, should apply to Stevens, Lanemer, Parry & Rollinson, 5 to 9, Quality Court, Chancery Lane, London, W.C.2. [5196

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SITUATIONS VACANT

ISLE of Wight County Council.

EDUCATION Committee.

ISLE of Wight County Technical College. Principal R. Hewitt, M.Sc.

TEACHER required for subjects in Workshop Technology and Production Engineering at the Isle of Wight County Technical College. Applicants should be qualified to teach all technology subjects covered by the City & Guilds Syllabus in Machine Shop Engineering and to the Syllabus as laid down by the Institution of Production Engineers.

EXPERIENCE in foundry work or welding will be regarded as an additional qualification.

FORMS of application may be obtained from the undersigned to whom they should be returned by 31st July, 1950.

A. L. HUTCHINSON, County Education Officer, County Hall, Newport, I.W. [5198

CIVIL SERVICE COMMISSION.

(1) Naval Cadetship (Special Entry)

(2) First Appointments in the Royal Marines.

(3) Entry to the Royal Military Academy, Sandhurst.

(4) Royal Air Force Cadetships.

A combined competition will be held, commencing on 31st October, 1950. A centre in Germany (British Zone) will be included in the list of centres for the written examination.

AGE LIMITS

NAVAL Cadetships (Special Entry), 17 years 2 months—17 years 10 months on 1st November, 1950.

FIRST Appointments in the Royal Marines, 17 years 2 months—18½ on 1st November, 1950.

ENTRY to Royal Military Academy, Sandhurst, 17½—18½ on 1st November, 1950.

ROYAL Air Force Cadetships, 17½—19 on 1st November, 1950.

APPLICATION Forms and Conspectus of the competition may be obtained from the Secretary, Civil Service Commission, Burlington Gardens, London, W.1, quoting No. 5129. Completed application forms must be returned by him by 17th August, 1950. [5197

EXPERIENCED draughtsman required for small gas turbine work.—Write Centrax Power Units, Ltd., High St., Brentford.

GLOSTER AIRCRAFT Co., Ltd., require an experienced Aerodynamicist; good salary offered to the right man.—Apply, giving full details of age, experience, qualifications and salary required, to the Chief Designer, G.A.C., Ltd., Hucclecote, Glos. [0577

SENIOR stressmen required immediately; first-class men with at least ten years' experience; unfurnished modern flats available to selected applicants.—Replies, giving age and full details of technical qualifications and experience, to be addressed to Personnel Officer, Saunders-Roe, Ltd., East Cowes, Isle of Wight. [0565

SITUATIONS VACANT

H.M. COLONIAL SERVICE—West Africa.

VACANCIES exist in Nigeria for Meteorologists for the West African Meteorological Service, duties involve responsibility for matters connected with climatology, meteorological research, forecasting for aviation, shipping, or agriculture, administration and training of staff; the posts are permanent and pensionable after a period of probation; basic salary, at a point according to qualifications and experience on the scale is £510 (for three years) to £1,000, plus pensionable expatriation allowance between £150 and £300; a temporary non-pensionable cost-of-living allowance equivalent to 10% of basic salary is also payable; where Government quarters are provided a rental of between £60 and £90 is deducted according to salary; free first-class passages are provided for officer and his wife once, each way each tour of service, and in addition an officer may be granted in any one tour either the actual cost of one return passage for each of two children under the age of 16, subject to a maximum of £75 in respect of each child or an allowance at the rate of £75 a year for each of two children under the age of 16, providing they are maintained outside Nigeria; income tax is at local rates, which are very much lower than those in the United Kingdom; tour of service 18 months; leave on full salary is granted at the rate of 5 days for each completed month of resident service; candidates must normally be under 40 and possess a first- or second-class Honours degree in Mathematics or Physics; (experience in aviation forecasting is desirable but not essential); they should write for a form of application to the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith St., S.W.1, giving brief details of age, qualifications and experience, quoting the reference number 27118/4 [5167

APPLICATIONS are invited from design draughtsmen and stressmen, also technical assistants with combined design and performance experience for work on both reciprocating and gas turbine aero engines.

APPLICATIONS should state full particulars of experience and qualifications and should be addressed to The Personnel Manager, The de Havilland Engine Co., Ltd., Stonegrove, Edgware, Middx. [0875

BRITISH MESSIER, Ltd., require young stressmen, preferably with experience on structural jig work. —Please write to Mr. E. G. Collinson, Chief Technician, British Messier, Ltd., Cheltenham Rd. East, Gloucester. [5170

PILOT/MANAGER, small Midland charter company, licence Rapides; permanency right man, business ability essential; accommodation available.—Write in first instance, to Box 5451, giving all details, salary expected. [5200

APPLICATIONS are invited from senior and intermediate design draughtsmen, experience of aero engine design desirable but not essential; please write, stating age and giving details of previous experience in chronological order, to—The Personnel Officer, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. [0849

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SENIOR ELECTRICAL or RADIO DRAUGHTSMEN preferably with aircraft experience.

LAYOUT DRAUGHTSMEN, preferably with aircraft experience.

Apply stating age, qualifications and approximate salary required, to :—

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Supermarine Works,
Hursley Park, Nr. Winchester.

SITUATIONS VACANT

HIS MAJESTY'S Colonial Service—Nigeria.

A VACANCY exists for an assistant meteorologist (Radio Sonde) to take operational charge of a radio sonde rawind station at Lagos. The post is permanent and pensionable. The basic salary scale is £510 (for three years) to £825, plus pensionable expatriation allowance between £150 and £250 a year. A temporary non-pensionable cost-of-living allowance equivalent to 10% of basic salary is also payable, and an officer on first appointment is eligible for an outfit allowance of between £30 and £40. When Government quarters are provided rent is charged at a rate between £60 and £90 a year according to salary. Free first class passages are provided for the officer and his wife on first appointment and on leave, and in addition an officer may be granted in any one tour of service either the actual cost of one return passage for each of two children under the age of 16, subject to a maximum of £75 in respect of each child, or an allowance at the rate of £75 for each of two children under the age of 16, providing they are maintained outside Nigeria. Income tax is at local rates, which are very much lower than those in the United Kingdom. The tour of service is 18 months. Leave on full salary is granted at the rate of 7 days for each completed calendar month of resident service. Candidates, who should have completed or have been exempted from National Service, must possess Higher School Certificate or its equivalent in mathematics and physics, preferably with experience of forecasting for aviation. Familiarity with radar would be an advantage. A candidate whose practical experience of forecasting is insufficient would be required to complete a course of training at the Meteorological Office. Applicants should write at once for a form of application to the Director of Recruitment (Colonial Service), Sanctuary Buildings, Great Smith St., Westminster, London, S.W.1, giving brief details of age, qualifications and experience and quoting the reference number 27118/5. [5203

PRACTICAL young engineer wanted; knowledge of light machine shop practice and assembly; must be hard worker and willing to take responsibility for permanent progressive post; accommodation might be offered.—Box 5389. [5191

EXPERIENCED Stressmen wanted by expanding aircraft organisation situated on the South Coast, outstanding local amenities; apply in writing, stating age, qualifications, experience, etc., to—The Personnel Manager, A.S.T., Hamble Southampton [0828

INTERNATIONAL company require radio mechanic for ground duties overseas; single candidates preferred with City and Guilds Certificates and experience airfield installations; inclusive salary approximately £475 to £650 free quarters, Pensions Fund.—Write Box 5390. [5194

SENIOR designers, first-class men with at least 5 years' aero-engine design experience required, also installational and power plant designers required with experience in power plant or equivalent aircraft work.—Applications to Personnel Dept., Engine Division, Filton House, Bristol [5156

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Please send me full details of Short Service Commissions as Pilot or Observer in the Royal Navy. I am between 17 years 6 months and 21 years old; unmarried; physically fit; up to School Certificate standard with credit in Mathematics.

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GOOD senior draughtsman required for interesting programme of new work.—Apply in the first instance to the Chief Engineer, Percival Aircraft, Ltd., The Airport, Luton. [6984

APPLICATIONS are invited from senior stressmen with first-class qualifications desirous of working on new project of most interesting kind; excellent prospects of advancement for candidates with experience and enthusiasm.—Apply, stating experience, qualifications and salary required, to Chief Technician, Gloster Aircraft Co., Witcombe, Glos. [6440

SENIOR technician-designer required by aircraft equipment company in the North-West; applicant should hold first or second class honours degree, and should have extensive experience in an approved aircraft design organisation. Four-figure salary offered for appointment, which is intended to lead to position of major responsibility.—Box 5465. [5205

SENIOR metallurgist required for work in small laboratory of aircraft factory, to be responsible for metallurgical and chemical investigations; applicant should have had experience in ferrous and non-ferrous metals, radiography and be capable of controlling all A.I.D. processes, including welding; technical education should be not less than Higher National Certificate standard.—Apply, stating experience, qualifications and salary required, to Employment Manager, Vickers-Armstrongs, Ltd., Weybridge Works, Weybridge. [5108

RADIO engineer with experience in technical sales work required by a large company in North London; applicants must have thorough knowledge of modern radio practice with some experience in the aviation field, since the work involves negotiating with all grades of personnel in Government Departments, and Aviation Companies, a University Degree is desirable, but not essential; applications will be treated in strict confidence, and must state full particulars of experience and salary required.—Box No. 5462. [5208

SITUATIONS VACANT

WANTED, "B" licence pilot with instructor's endorsement. Rapide. Aneroc.—Apply, giving full particulars in writing only, Darlington Aero Club, 41, Blackwellgate, Darlington. [5195

PHYSICIST (male) required in research and development laboratory of large well-known concern; essential qualifications, should be graduate in physics with high standard of mathematics and have had some experience in industry. Work will mainly be on development of mechanical, thermal and electrical equipment of precision nature. Applicants should give full details of age, training and experience (in chronological order) and indication of salary required. Only those who conform to requirements of advertisement need apply to—Box 5416. [5198

RESEARCH engineer, or engineer physicist, aged approximately 28-35, with a good honours degree and practical experience, is required to take charge of a small team of engineers and physicists engaged on vibration analysis and metrology in connection with steam and gas turbine components and associated gearing. The team is also responsible for the development of certain specialised instruments in this field. Reasonable acquaintance with electronic methods required, though specific electronic developments are in the hands of an independent section; salary £600-£850, depending on qualifications and experience.—Box 5455. [5204

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RADIO officer, experienced British, European, Europe to Far East routes, all types radio equip.; 3 languages fluent; seeks post, home or overseas; write.—E. H. Gull, 29, Nevern Pl., S.W.5. Tel. Messages Fro. 4000. [5166

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FRENCHMAN, 26, senior design draughtsman, Industria. High School Graduate, 6 years' experience metal aircraft construction in French aircraft factory, knowledge of plastic materials, laminanta, fluent English speaking, 50 flying hours, seeks position either drawing or administrative office.—Write Cadieu, Malousse, Aix en Provence, France. [5207

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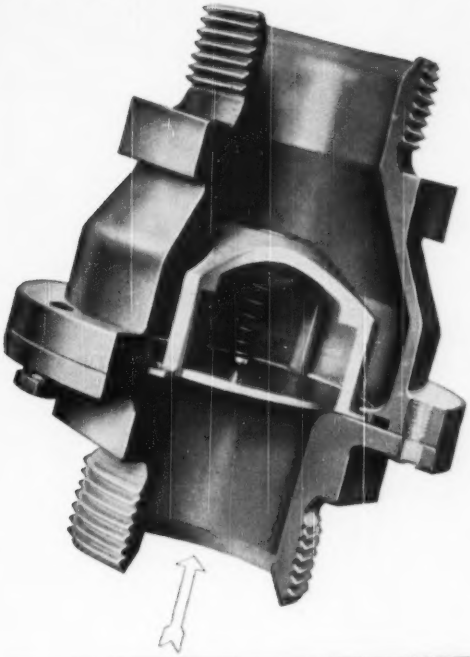

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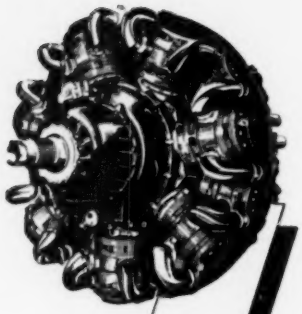

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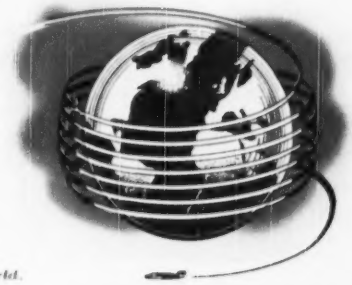

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